IRON AGE

THE NATIONAL METALWORKING WEEKLY A Chilton Publication SEPTEMBER 28, 1961

Joe Clark

★ Pontiac's S. E. Knudsen—

Auto Industry Goes Into "Tryout" Phase p. 55

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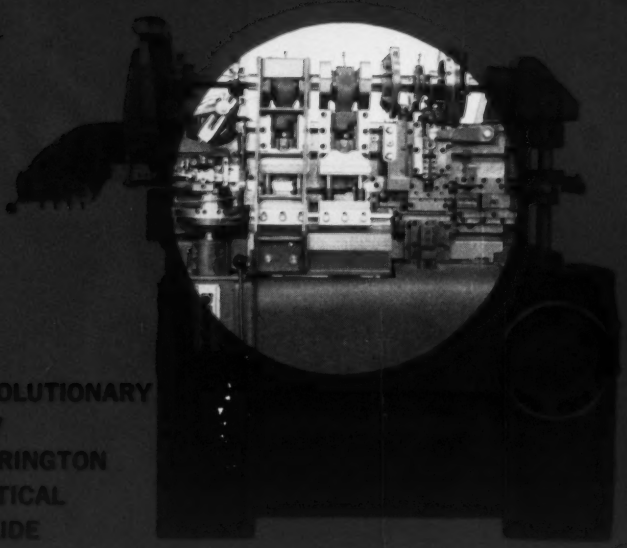

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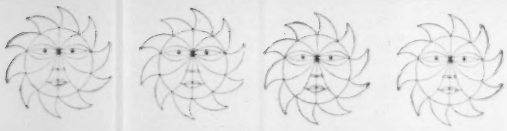

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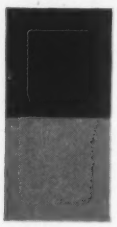

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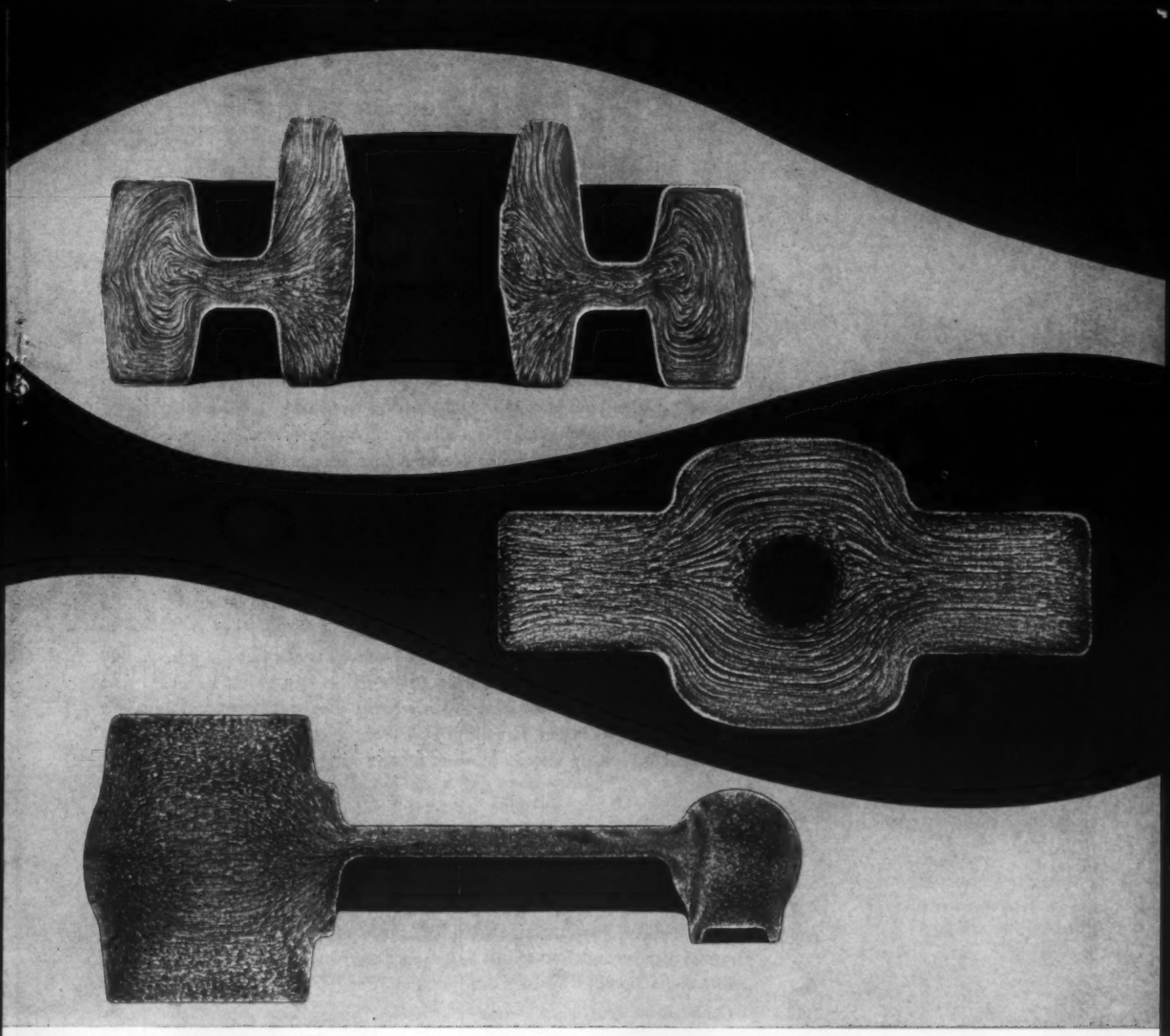

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September 28, 1961—Vol. 188, No. 13

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Special This Week

Autos: Industry, Buyers Are Confused

For 1962, the auto industry is offering more of everything—sizes, models, horsepower, and accessories. But auto executives such as Pontiac's S. E. Knudsen say it isn't intended to confuse the buyer. (Though they admit that may happen.) Rather, they say, it is tryout phase to determine what customers want. p. 55

Economic Forecasters Look at '62

Top economic forecasters from a broad cross-section of industry began their annual climb-out on economic limbs last week. Almost without exception, they see a continuation of the recovery and strong gains being recorded in the next year. p. 58

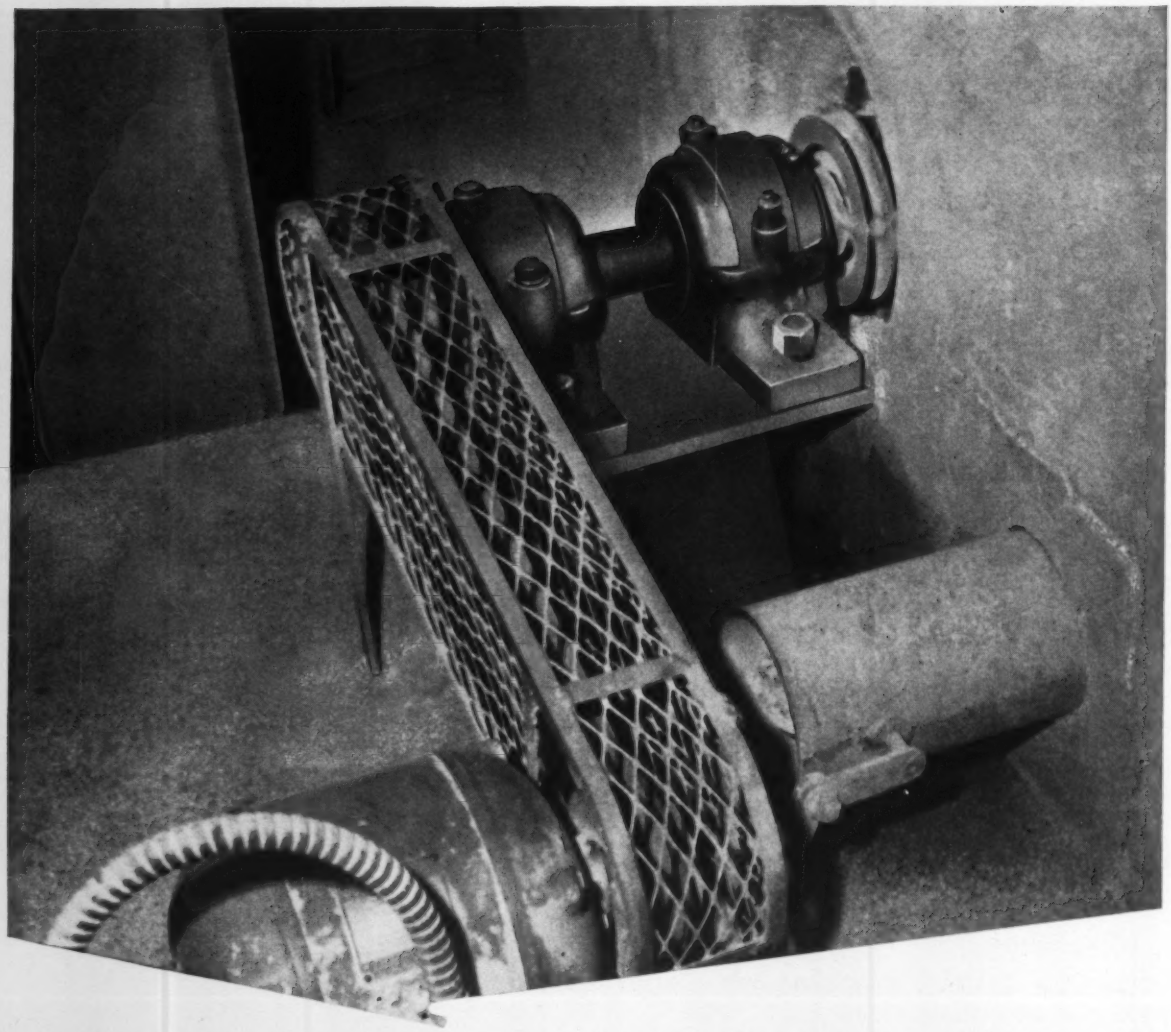
How to Weld Malleable-Iron Castings

Reports from a battery of sources indicate that malleable is more weldable than most people think. There are hundreds of malleable castings in use which are joined to other parts. By using the tricks of the trade, you can obtain sound weldments. p. 85

Next Week

West Berlin: Thriving in the Crisis

It's business as usual in West Berlin, a city which seems to thrive in the face of danger. Next week's Special Report, by Editor G. F. Sullivan, is from West Germany's largest industrial city which lost 60,000 workers when East Berlin's iron curtain clamped down again.



Galled and frozen shafts eliminated . . . a costly maintenance problem solved!

Twenty special, high temperature, recirculating fans installed on a furnace in a Missouri brick plant were a constant expense and source of trouble due to the failure of the water cooled, babbitted bearings.

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Business Is Friendless: Make No Mistake About That!

The President is said to be puzzled because government has been accused of being anti-business. Either he is kidding or he is indulging in some good old-fashioned Irish blarney.

Business has striven mightily to offset high wage costs, to compensate for fantastic fringe benefits, and what does it get? Demands for more of the same. And, to boot, demands from the White House to absorb with a smile any new costs.

Let a few banks get permission from proper governmental authorities to merge and what happens? Another branch of government rushes in to stop the action—either by hastily-planned gobbledegook or by time-worn courtroom gimmicks.

Behind the effort to stop a steel price rise is the threat of dire action from the Senate, from the Federal Trade Commission, and possibly from the Justice Dept.

Small firms are told the government loves them. Then the gates of relief from costs are slammed shut with a summit demand that there be no price changes. There is no attempt to go before Congress and argue for an honest rule for legislative controls: Mainly, of course, because it might be defeated.

Let a businessman speak up for profits, a day's pay for a good day's work, a blast against socialism, or a criticism of waste and loony foreign aid tactics, and what happens? The poor guy is accused of being a big wheel who has no feelings, no religion, no morals, no patriotism, and no feeling for his fellow men. That's why so many won't talk any more.

Talk about profits and it is labeled obscene. A man making a fair return today on invested capital is classed somewhere between a greedy heel and a fellow who just doesn't know the score.

When a businessman makes a good talk, it hits the financial page—maybe. When Mr. Kennedy cracks the whip, it hits the front page. When a businessman attacks labor unions or their methods, he is a backwoods mountebank and his remarks are on the back pages—if covered at all.

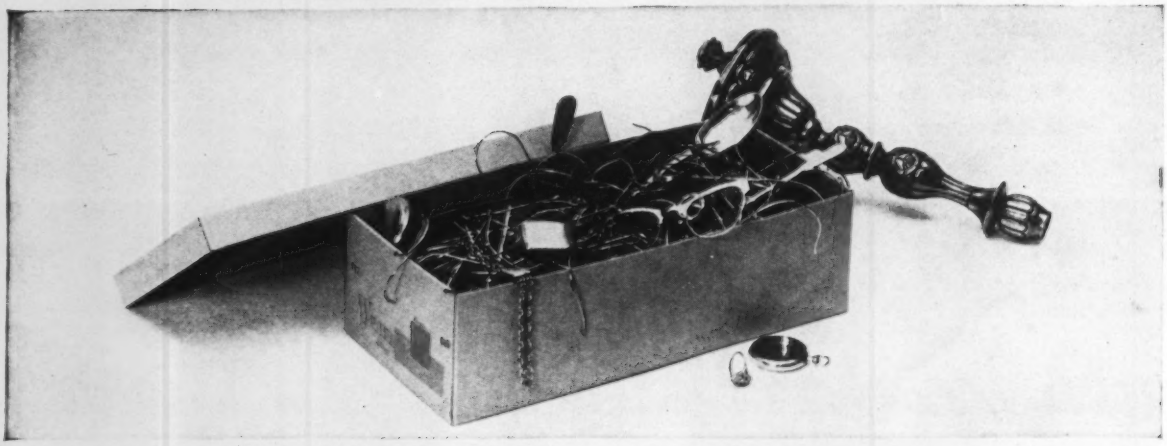
But if the labor leader attacks and calls this businessman a yellow-bellied no-good exploiter of the people, it rates a good head and story. And there are always a lot of guys in Washington to back up the accusation with more high-sounding flit.

What do you mean there's no anti-business sentiment floating around Washington (and other places)? The place is lousy with it.

Tom Campbell

Editor-in-Chief

HERE YOU SEE IT



HERE YOU DON'T!

Value is what we're talking about. There isn't a soul alive who would knowingly throw away a gold or silver or platinum watch case or pin or eyeglass frame. Because they're *worth money*. This sense of value is responsible for a considerable part of Handy & Harman's Refining activity. Constantly, we are sent precious metal scrap from retail jewelers all over the country. (Yes, often in shoe boxes.)

And just as constantly we wish that industry had the same sense of value when it comes to their precious metal "waste." Just because it doesn't *look* like anything doesn't mean that it isn't *worth* something.

To show you where profits lurk, we've included a list showing the various forms of precious metal waste.

It is by no means complete (it is possible that you have other forms). May we suggest that—should you be in doubt—you contact the Handy & Harman Refining Center nearest you. Further, if you are not in doubt about your waste bearing precious metals, but you are (or have been) in doubt as to its full value, it will profit you to send it to us. Our Bulletin 24 describes our Refining Division in detail. A copy awaits you at

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- Solder Scrap
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- Contact Alloy Scrap
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Business Good, Getting Better

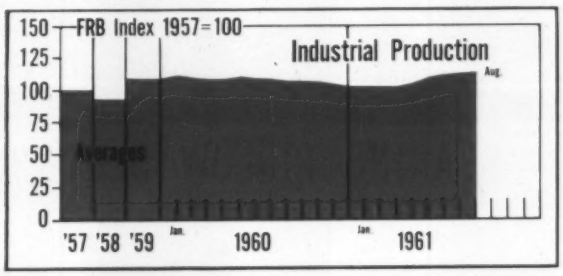
The autumn uptrend continues. And the rate should accelerate when some "details" like the auto strikes are out of the way. Secretary of Commerce Luther Hodges says the Gross National Product is now moving at an annual rate of $526 billion. This compares with the second quarter rate of $512 billion. So far, most of the extra push has come from primary metals, particularly steel, and some other durables. Automakers have not yet put production into full gear, but that should be remedied within a week. Some indicators, see below, still resist the upward push.

However, pessimism at this time just isn't warranted. Improvement is following seasonal trends and October and November will be good months for metalworking. But it will be next February or March before a real boom is felt.

(For the 1962 business outlook, see p. 58)

Does FRB Index Show All?

Is manufacturing really rolling along at the record rate indicated by the Federal Reserve Board's Index



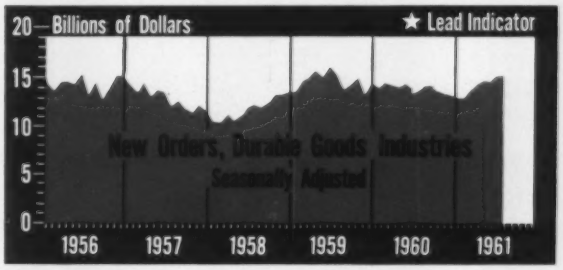
of Industrial Production? Many in industry were surprised when the Index hit 112 in July; now it's at 113 and may be headed higher. July and August were recovery months, true, but few consider them record business months. The probable reason: Business did not decline as much seasonally as expected. Therefore, seasonally adjusted figures distorted the gains to a degree. The probable result: With production really going good in September and October, the Index will not reflect equal gains.

Business Failures Climb

All the lively indicators don't help the near-record number of businesses that folded in August. The number, 1604, was close to the post-war peak. And liabilities, at $102.7 million, have been exceeded only twice in recent years (Dun & Bradstreet).

Durables' Sales Move Up

One of the most significant signs of a business recovery is in full view: New orders for durable goods



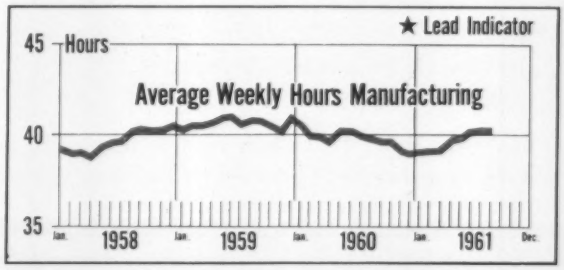
are advancing more rapidly than sales. This means longer backlogs, more orders on the books, and points to a full-scale rise in metalworking. For August, durables' new orders hit $15.3 billion. Sales (shipments) also climbed, but at a rate of $14.9 billion. New orders are now up 6 pct from a year ago; sales up 3 pct.

Housing Up, But Just a Little

Little help to general business is reflected in home construction. Starts were up 1 pct from July in August to an annual rate of 1.38 million. The Administration continues to talk about easier mortgage terms, but to little effect so far. Government economists see little change in housing rates until around 1966 when a rate of 1.6 million should be reached.

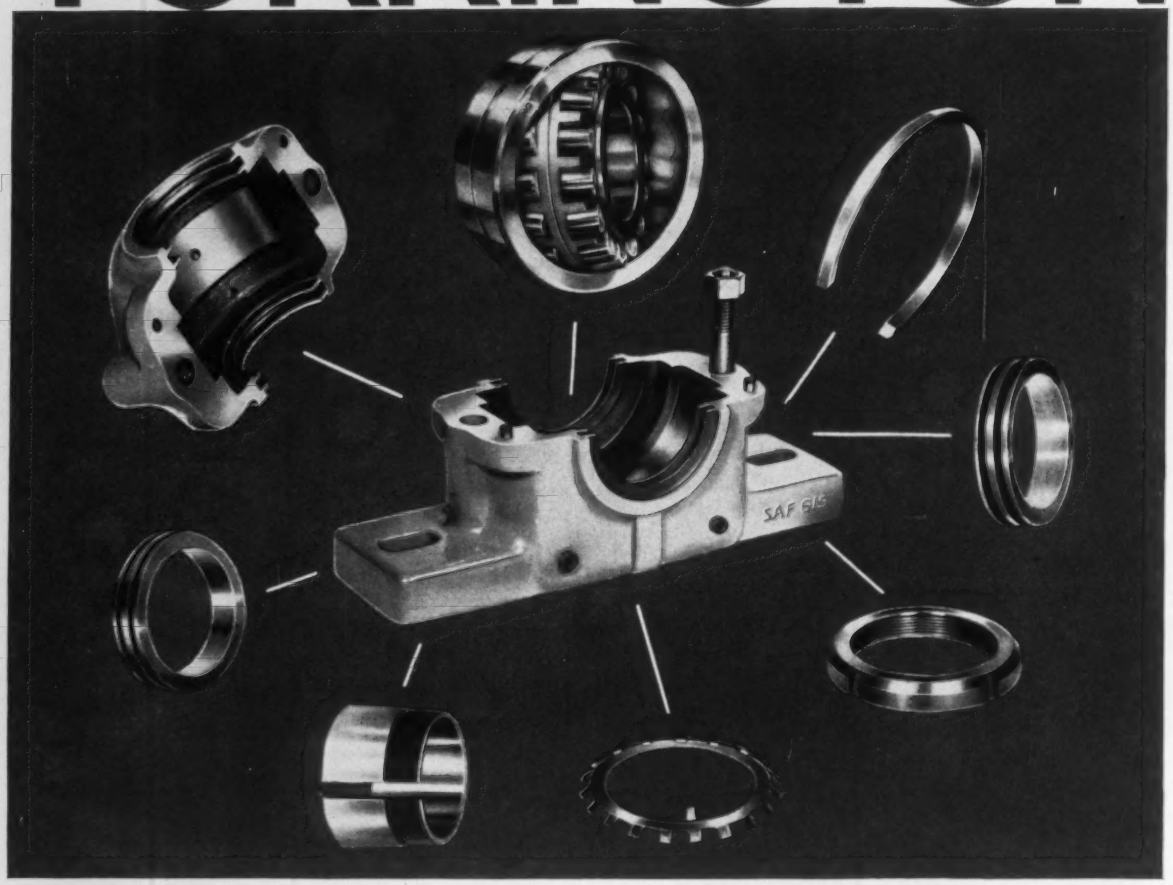
Not Much Overtime—Yet

Cross currents in the recovery are reflected in the factory workweek, unchanged in August at 40.1 hours. To some extent, this sensitive indicator does not bear out other, more bullish figures (the FRB Index, for



example). However, hours in the primary metals group are up 2.3 hours per week from the eleven-year low in August, 1960. On the broad trends, the stability of the workweek at close to 40 hours indicates that employers may be taking on workers, not adding overtime.

TORRINGTON

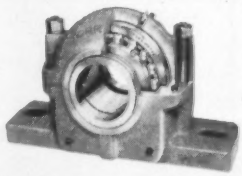


TORRINGTON SPHERICAL ROLLER BEARING PILLOW BLOCKS ...THE INSIDE STORY

All these parts make up a standard series Torrington Spherical Roller Bearing Pillow Block. What you *can't* see in the illustration is the painstaking engineering that goes into each part.

Housing caps and bases, for example, are doweled in pairs throughout manufacture to insure perfect register. The triple labyrinth seals are designed to avoid rubbing contact. A removable stabilizing ring allows "fixed" or "float" operation. The Torrington Self-Aligning Spherical Roller Bearing provides top operating efficiency even under heavy load and misalignment.

Do you have a pillow block problem? It pays to investigate the outstanding performance and long service life of the Torrington Spherical Roller Bearing Pillow Block. Call or write us today.



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UAW-GM: Nobody Out But the Rebels

The UAW reached a full national agreement with General Motors Corp. last week. But local issues delayed a full return to work.

Leaders from 24 locals, still showing a stubborn streak, were called into Detroit by UAW president Walter P. Reuther. Meetings were scheduled over the weekend between the rebel and top union and management negotiators.

Biggest trouble spot: The key Fisher Body plant at West Mifflin, Pa., near Pittsburgh. It supplies nearly all GM divisions. UAW officials have been worried over a revolt of the Local leadership.

"If they defy us down there, then we're going in there in force to preserve the integrity of this union," threatened Mr. Reuther. "If there is any more trouble with that Local, we're going to brush those Local officials aside and go over their heads to Local 544 membership."

Ford is the next settlement target for the UAW. Only brief bargaining sessions have been held recently while the union and GM worked toward a total settlement.

Workers at both Ford and Chrysler are restive.

Ford Locals have been given the OK to strike if "necessary." But talks continue under the indefinite contract extension which requires 48 hours cancellation notice.

As of last Monday morning, the company and union had settled local issues at 19 of 73 Ford plants. And production was booming.

USWA: Independent Is Foe at Midwest Steel

Hourly employees at Midwest Steel Div. of National Steel Corp., at Portage, Ind., will vote Nov. 15-16 to select a bargaining agent.

United Steelworkers of America and the Independent Steelworkers of Indiana have each filed petition with the National Labor Relations Board asking to represent the workers. ISWI is a new union, formed to represent Midwest workers.

USWA represents employees at National's Great Lakes Steel Corp. However, its Weirton Steel Corp. has a company union.

Promise to Speed Up Minimum Wage Rulings

Dept. of Labor is going to speed up minimum wage determinations for industries selling to the government.

Labor Secretary Arthur J. Goldberg says he can cut about two years off the time needed to determine minimum wages under the Walsh-Healey Act.

He says he can hold public hearings and decide what the prevailing wage is in each industry in less than a year. A decision has often taken two to three years.

IUE: Carey Joins Cry For New Trucker Union

James B. Carey, president of the International Union of Electrical Workers, has taken up the cry for the AFL-CIO to charter a new Teamsters' union. This is reported in the September issue of the IUD Bulletin, published by the Industrial Union Dept. of the AFL-CIO.

UAW-AMC: Their "Rights"

Management-rights clause of the new agreement between American Motors Corp. and UAW effectively closes the books to the union. But it does more. It states the rights of the parties to conduct their business without interference from the other.

The union agrees not to ask bargaining in five areas:

1. Change or modification of management rights clauses in working agreements with local unions;

2. Right to determine products to be manufactured, and their design and engineering;

3. Right to determine methods of selling, marketing and advertising products, including pricing;

4. Right to make all financial decisions, including the right to maintain the corporation's financial books and records in confidence;

5. Right to determine management organization, including selection of employees for promotion to supervisory and other managerial positions.

In turn, AMC agrees not to ask the union to bargain over initiation fees, dues, assessments and fines; election or appointment of union officers, stewards, committeemen, or other union representatives; procedures for formulating demands, for deciding on strike action or other concerted action, and for ratification of agreements. However, AMC may "bring to the attention of" the union any matter "bearing on relations between them."

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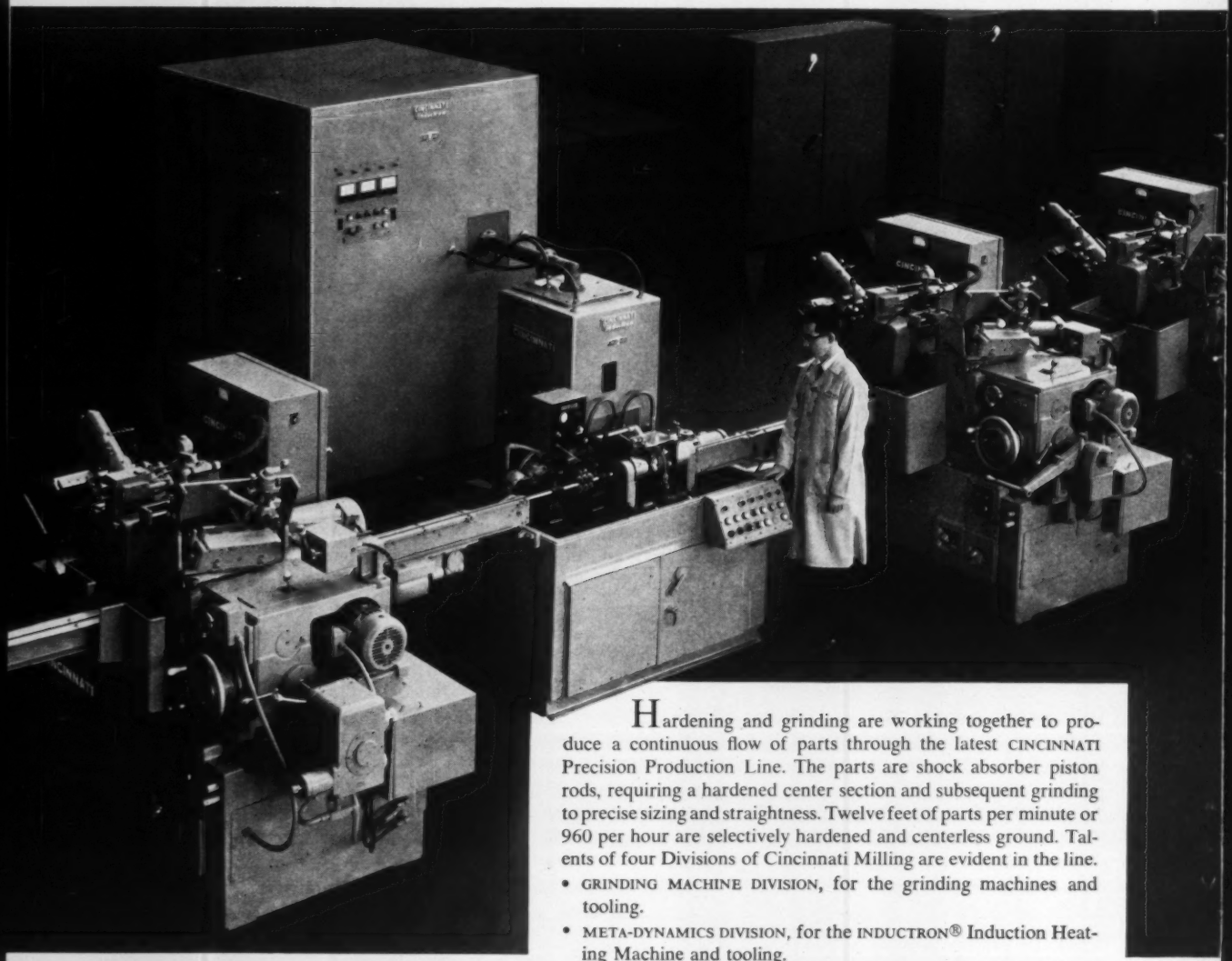
CINCINNATI combines talents of four divisions

... to produce continuous flow of precision parts



Perfection, 960 times every hour. Continuous flow of shock absorber piston rods, selectively hardened and centerless ground on this CINCINNATI Precision Production Line, eliminates unnecessary work handling. Line consists of five CINCINNATI FILMATIC Centerless Grinders and one INDUCTRON Induction Heating Machine.

Hardening and grinding are working together to produce a continuous flow of parts through the latest CINCINNATI Precision Production Line. The parts are shock absorber piston rods, requiring a hardened center section and subsequent grinding to precise sizing and straightness. Twelve feet of parts per minute or 960 per hour are selectively hardened and centerless ground. Talents of four Divisions of Cincinnati Milling are evident in the line.

- GRINDING MACHINE DIVISION, for the grinding machines and tooling.
- META-DYNAMICS DIVISION, for the INDUCTRON® Induction Heating Machine and tooling.
- PRODUCTS DIVISION, for grinding wheels and cutting fluids.
- CIMTROL DIVISION, for control equipment.

Cincinnati Milling can give you the advantage of many engineering talents in building metalworking machines and production lines which will produce a better product at a far lower cost. May we send you more information? **Grinding Machine Division, The Cincinnati Milling Machine Co., Cincinnati 9, Ohio.**

CINCINNATI®

GRINDING MACHINE DIVISION

PRECISION GRINDING MACHINES: CENTERTYPE • CENTERLESS • MICRO-CENTRIC • ROLL • CHUCKING • PRODUCTION LINES

★ Steel Price Assault Goes On

If you think the Kennedy Administration has ended its assault on steel price increases, you have another thought coming. Behind the scenes, the White House continues to build a case against steel.

Administration officials are attempting to get confidential steel cost and price data out of the U. S. archives. These records were filed by steel companies as required by OPA (The World War II price control agency) and OPS (price control agency of the Korean War).

The Administration apparently thinks it can bolster its case against price hikes with this information. **Though the information is supposed to be confidential, the Administration can be very persuasive in such matters.**

And persuasion also will continue to be used on steel companies. Moral persuasion won't stop with the President's letter to the top company presidents. There is some talk of calling steel company executives to Washington for management conferences.

Last week, President Kennedy carried his case personally to Roger M. Blough, chairman of U. S. Steel. The President and Mr. Blough discussed steel prices for one-half hour at the White House.

Mr. Blough apparently made no promises, but officials say his reaction to the President's plea was reasonable.

Whether or not the President will go beyond moral persuasion still remains to be seen. He cannot put direct controls on prices without the consent of Congress.

However, through his executive power, the President has means of indirect control. **For instance, he could apply pressure through manipulation of government contracts, Federal controls of money and credit, and the stockpiles of metals.**

Remember, President Kennedy has warned that the consequences of a rise in steel prices "might be grave." He is ready to adopt what he calls "restrictive monetary and fiscal measures."

■ Bonus or Penalty For Defense Contractor

An old contracting method is coming back to the Pentagon. It is the "bonus or penalty" contract.

Supported by Defense Secretary McNamara, the armed services have been studying ways to reward contractors for a job well done and to penalize them for poor performance.

The U. S. Air Force is the first service to put the system into effect. While the method is not new (The Wright Brothers had a similar contract for the first military airplane), it has not been used recently. The Army and Navy are studying similar approaches to incentive contracting.

For good performance, the Air Force will pay bonus fees up to 15 pct of cost on research and development contracts.

Up to 10 pct will be allowed on production contracts. At the same time, penalties for contractors whose costs or prices exceed estimates could cost them a portion or all of their profits.

The choice of contract is up to the contractor. But in seeking the bonus contract, the contractor offering the deal to the Air Force must face the penalty if he fails to meet requirements.

■ Will Business Records Be Public?

The fate of legislation giving the U. S. Justice Dept. power to take businessmen's records without legal action will be decided in the House next year.

The bill will give the Justice Dept. the same power now enjoyed by the Federal Trade Commission. Under the bill, the Justice Dept. would be able to take company records for use in civil antitrust cases without court order.

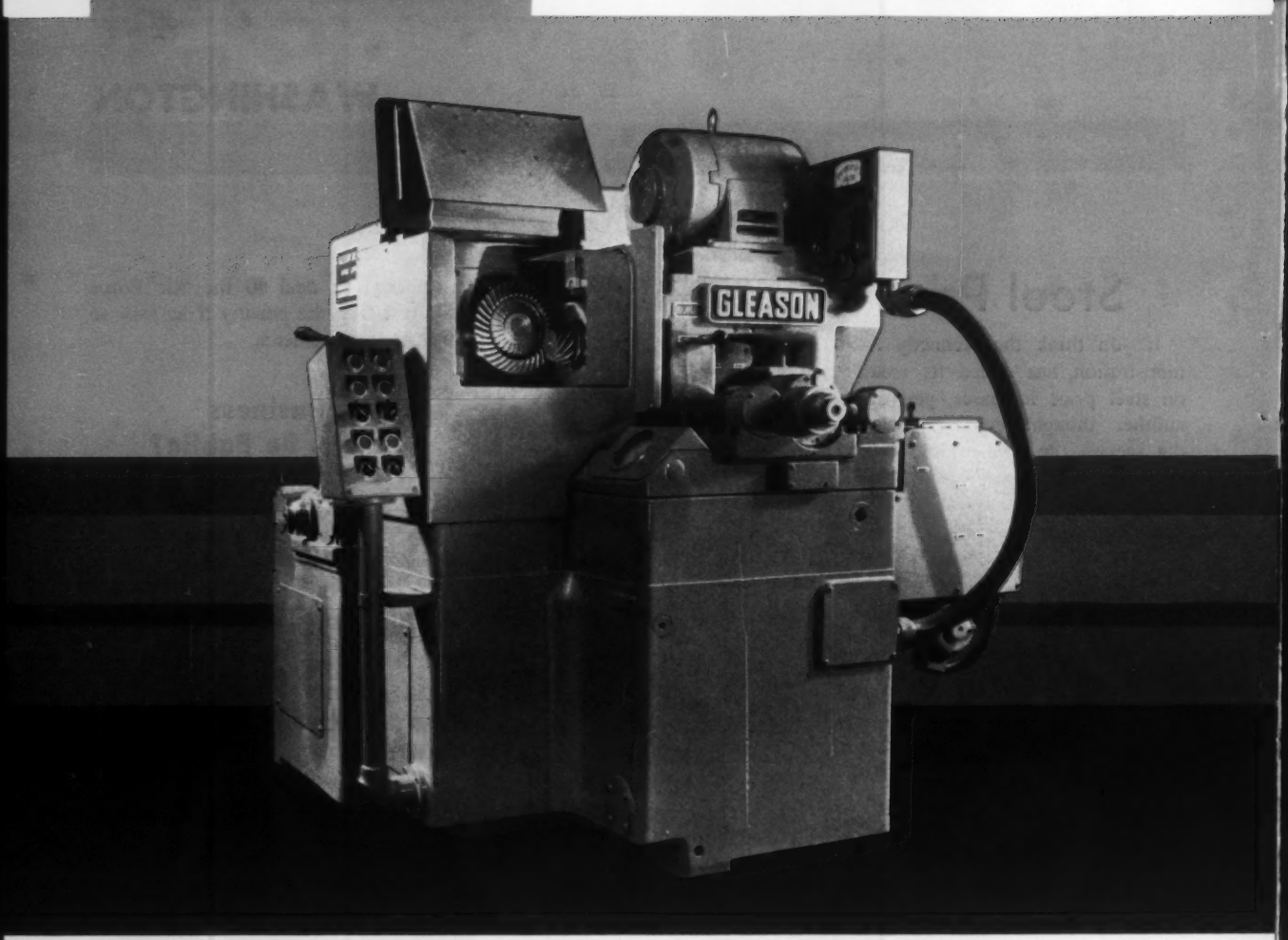
■ Identical Bids Scrutinized

The war against identical bids is getting hotter. Congress is pushing government agencies to report all suspicious bids to the Justice Dept.

The reports are required under a directive from President Kennedy. The President ordered that all identical bids of more than $10,000 be reported to the Justice Dept. for possible antitrust prosecution.

Congress is considering making the directive law. Meanwhile, the joint Senate-House Economic Committee scolded government agencies for laxity in their reporting.

Along with the scolding, the Committee made public a random sample of 93 lots of bids involving identical bids compiled by the Justice Dept. Of the 93, eight were from primary metal industries, one was from a fabricated metal products firm and three were from machinery industries, other than electrical. The sample, taken from the period since 1955, included 36 electrical machinery bids.



New "Swing Pinion Cone" concept basic in Gleason No. 503 Hypoid Lapper

SPC is a completely new concept in the lapping of spiral bevel and hypoid gears. With this method, improved refinement of tooth surfaces is obtained, resulting in quieter, smoother-running gears.

SPC is accomplished on the No. 503 Hypoid Lapper by actually pivoting the pinion member in a horizontal plane about a point that is the approximate center of the tooth mesh. This motion, combined with a corresponding horizontal movement of the pinion member during the lapping cycle, moves the contact uniformly over the entire tooth surface to insure complete lapping.

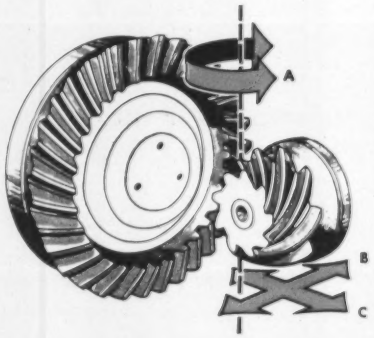
Previously prolonged lapping has been a major problem. However, extended tests have conclusively proved "prolonged lapping" with SPC does not have a major effect on the tooth contact pattern or tooth shape. This feature removes the problem of decreasing the amount of pinion axial adjustment during assembly.

Completely Automatic Cycle. Once the correct lapping cycle is established, all of the motions are completely automatic. Complete control of the lapping cycle, including such features as faster lapping time, independent lap of coast and drive side and proper backlash, are independently set through a convenient "dial-in" system.

Faster Production. An increase of approximately 20% productivity is obtained on the No. 503 Hypoid Lapper employing SPC.

The No. 503 Hypoid Lapper is a high production lapper, intended for automotive or custom gear shops, and accommodates 90° shaft angle gears up to 10″ in diameter. The No. 504 Hypoid Lapper, our larger model, will handle gears up to 36″ in diameter. Shaft angles on this machine can be extended to a 10°-160° range.

For more information and specifications, please write for technical bulletins.



SPC LAPPING MOTIONS: The swing motion of the pinion head (A) moves the bearing along the length of the tooth. The axial motion of the pinion head (B) moves the bearing up and down the tooth profile, while the motion of the pinion head in the direction of the gear axis (C) maintains constant backlash.

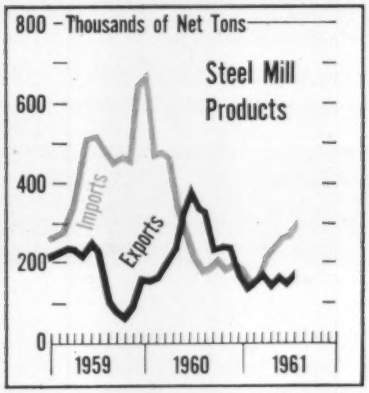
GLEASON WORKS

1000 UNIVERSITY AVE., ROCHESTER 3, N. Y.

Steel Export, Import Climb Continues

Exports and imports of steel mill products climbed again in July. But overseas sales still lag 60 pct behind those of last year.

In the first seven months of this year, 1 million tons were exported,



compared with 1.8 million tons in the same period last year. July exports totaled 168,000 tons, an increase of 22,000 tons over June but only half of those in July a year ago. Cold-rolled sheets, tinplate and steel pipe accounted for most of the July gain.

Imports for the first seven months totaled 1.6 million tons, compared with 2.4 million tons for the same period in 1960. Steel product imports in July totaled 300,000 tons, 23,000 tons over June and 124,000 tons higher than July a year ago. Increased purchases of steel pipe and semi-finished steel accounted for most of the rise.

Warehouses Report Upswing in Canada

Steel service centers in Canada are enjoying a business upswing.

A survey by Canadian Steel Warehouse Assn. indicates 75 pct of the service centers consider business activity "good"; 70 pct see further second half gains, ranging from 3 to 30 pct over the second half of 1960. The upswing is across the board of steel products. Significant is the fact that 75 pct of warehouses are maintaining lower inventories than at the same time last year. But lines are being augmented by facilities for shearing, burning, cutting and slitting.

U. K. Lament: 1-in-20 Work for U. S. Firms

A hassle over growing U. S. investment is building in Britain. Complaints are similar to those heard from Canada in the past few years over U. S. business involvement in the Canadian economy.

British Labour MP B. Edwards claims every 20th British worker is now employed by an American firm. He complains local managers have no power to negotiate with labor in England: All labor-management decisions must be cleared with the U. S. home office.

London Columnist Peter Simple rallied to the defense of U. S. industry. He asks, "Does Mr. Edwards object to jobs being made for our own workers, by foreign capital investment, which we cannot make for ourselves?"

Congress Gets Set For Trade Hassle

U. S. foreign trade looks like the legislative battle ground of 1962. The fight will center around:

1. Reorganization of U. S. trade policy in light of expiration of the Trade Agreements Extension Act of 1958.

2. U. S. exports to iron curtain countries.

President Kennedy's new special assistant to develop a new international trade program, Howard C. Patersen, is evaluating what policy changes should be made.

Both the House and Senate are concerned with trade with Iron Curtain countries.

Airco Supplies Three Chilean Gas Plants

Airco Co. International is supplying three industrial gas plants to Industria Chilean de Soldaduras, S. A. (Indura), of Santiago, Chile.

Two oxygen plants and an acetylene generating facility will go on stream later this year. They will increase the use of industrial gases in general metalworking in Chile. The oxygen plants will have a total capacity of 142 tons per month;

One of Three: Chile-Bound

the acetylene, 4800 cu ft per hour.

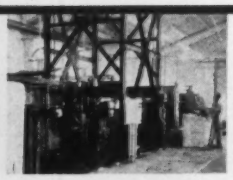
The plants will be located near the present Indura electrode manufacturing plant outside Santiago. In addition to oxygen and acetylene, the plants will produce nitrogen.

Renault Tops List

By gross income the biggest company in France is Renault, according to Enterprise, a French business weekly. In net profits, the automaker now ranks fifth, behind three oil companies and Pechiney, an aluminum and chemical leader.

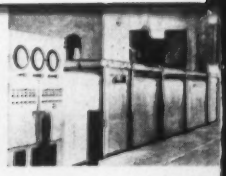
Western Metals Decorating Co.

U. S. Steel Corp.



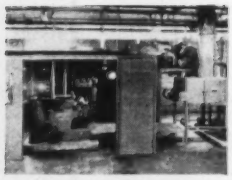
Aluminum Company of America

Zegers, Inc.



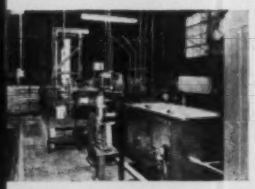
Artcraft Venetian Blind Mfg. Co.

Orchard Brothers, Inc.

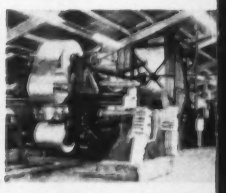


Crown Aluminum Industries Corp.

American-Marietta

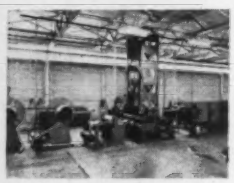


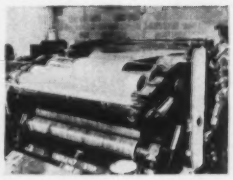
Kaiser Aluminum and Chemical Co.

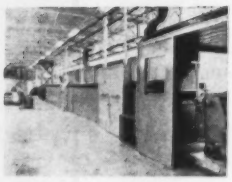


Aluminum Company of Canada

Litho-Strip







Reynolds Metals Company

Wheeling Steel Corp.

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New Job for Welding

Submerged-arc welding is being put to use in Sweden to fabricate I-beams and channels from flat stock. The machine for this work consists of two or four automatic-welding heads and a corresponding number of dc-power sources and wire feeders. Speeds up to 5½ fpm are not unusual. The same basic system also welds tubes.

Makes Tough Steel Tougher

High-grade steel can be further strengthened by decreasing its sulphur content. This is done with calcium inoculations under conditions of high-slag basicity. According to an Army Ordnance Corps report, broken desulphurized tensile bars of 4325 and 4340 steels showed improved ductility and toughness over normal steels.

Foamed Fin for Rockets

Substitution of polyurethane foam in place of conventional sandwich-construction materials results in cheaper, lighter and stronger rocket fins. According to an Atomic Energy Commission report, foam fins cost only ¼ as much as cast-aluminum structures. At the same time, foam fins will carry a compressive load of 60,000 psi. The foam acts as anti-buckling agent, while the leading and trailing edges of the fin perform essentially ly the same way as an I-beam.

Controls Ionic Power

Operating on 110-v ac current, a capacitor-discharge unit yields controlled ionic power which can reorganize the molecular structure of solid materials. In turning a material into plasma form, it releases up to 1 million amp. Physical limitations range up to 25,000°C, with pressures from 500,000-psi to 30,000-atm vacuum. Potential metalworking uses include: Forming, bonding, metal purification, plating, oil impregnation, welding and piercing of flanging.

Rockbusting Electricity

Good news for the mining industry—a new, non-explosive method for breaking rock with radio-frequency electrical power. It's not hard to visualize savings of up to 25 times the present cost of blasting when you consider there's no drilling, loading of explosives, or helter-skelter of personnel. According to test reports, the new principle can be successfully adapted to most modern-day mining operations.

First "Perfect" Magnet

Westinghouse research labs have achieved one of the most sought-for goals of modern science: The first superconductive magnet. Key to this advance is columbium-zirconium wire, which retains its superconductivity in strong magnetic fields. Here's what scientists have to say about the breakthrough: "It enhances our chances for direct, large-scale generation of electric power. It suggests a whole new generation of powerful atom smashers. It may lead to magnetic bottles that can harness thermonuclear reactions."

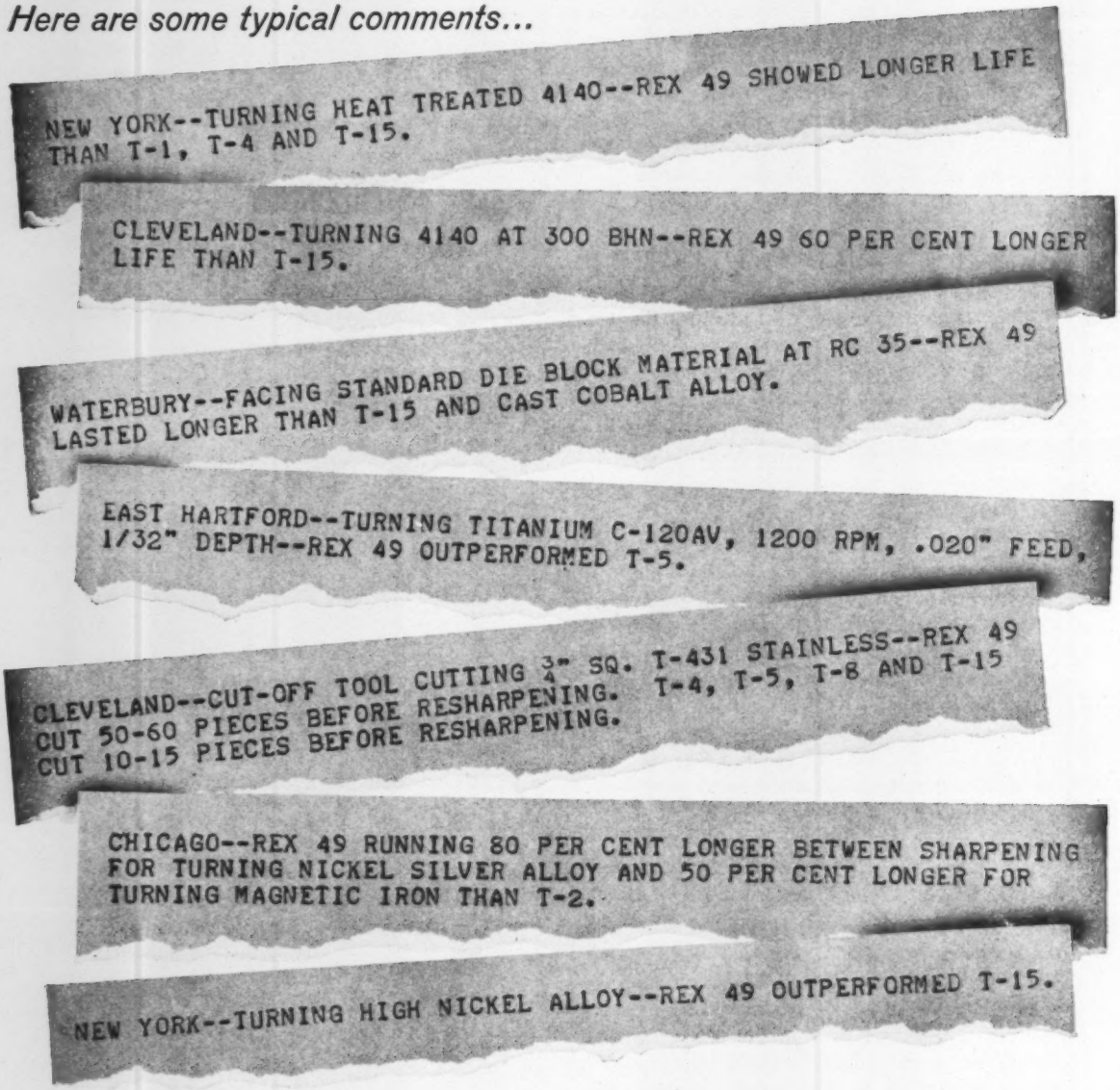
SUPERMAGNET: Windfall for science.

Tapes Control Diemaking

One of the last areas where the machinist's skill reigns supreme is about to yield to automation. Automakers are ready to convert diemaking to tape-controlled machine setups. Several units have been secretly tried out on an experimental basis for several years. Now, some auto companies are installing production units. Big gains lie in the mathematical development of curves on large body dies. Up till now, this was a cut-and-try proposition with extended lead time.

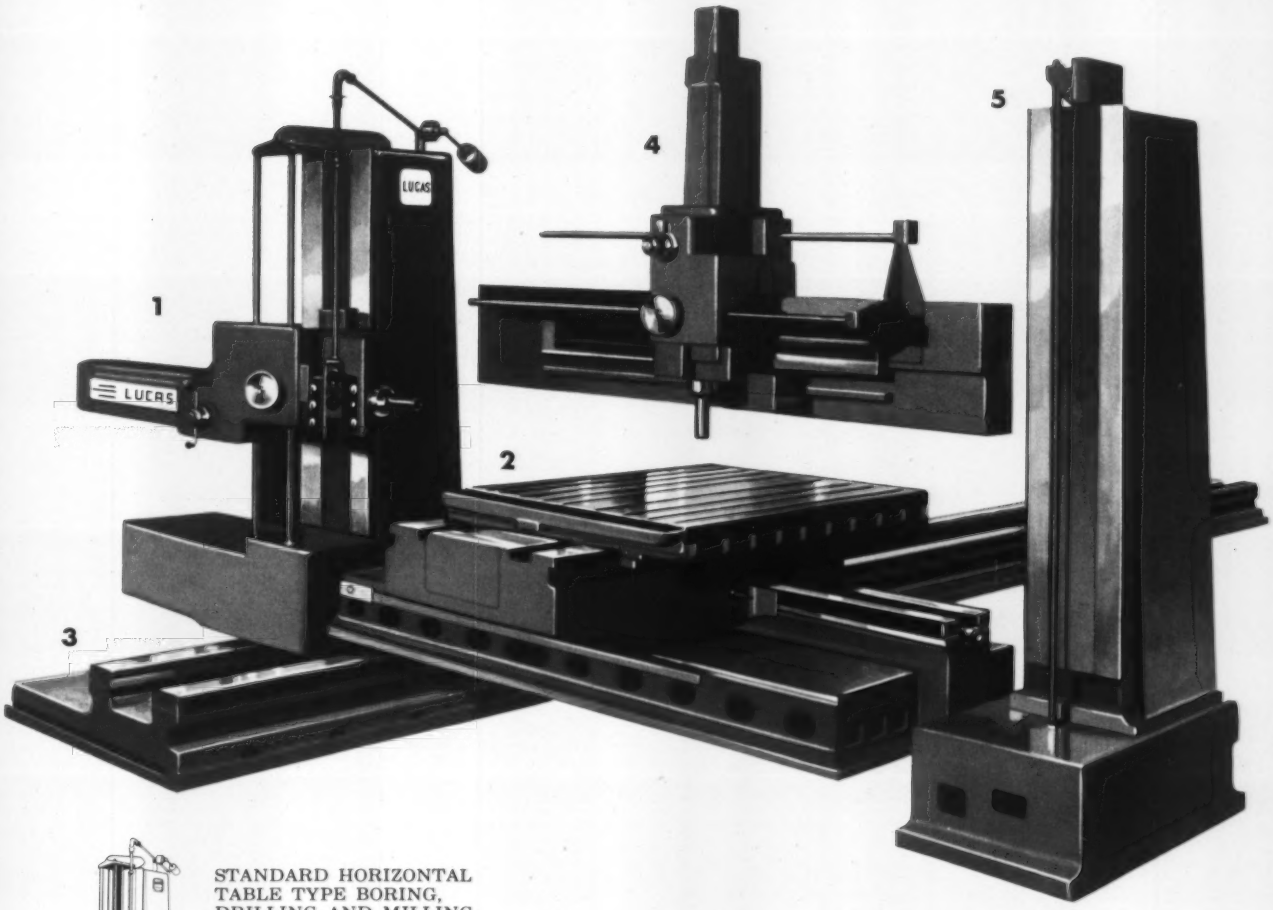
73% of first field reports indicate REX® 49 outperforms other high speed steels

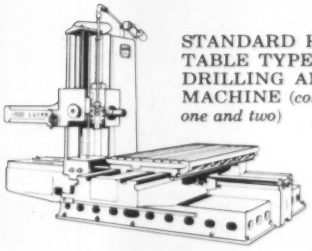
Here are some typical comments...


NEW YORK--TURNING HEAT TREATED 4140--REX 49 SHOWED LONGER LIFE THAN T-1, T-4 AND T-15.
CLEVELAND--TURNING 4140 AT 300 BHN--REX 49 60 PER CENT LONGER LIFE THAN T-15.
WATERBURY--FACING STANDARD DIE BLOCK MATERIAL AT RC 35--REX 49 LASTED LONGER THAN T-15 AND CAST COBALT ALLOY.
EAST HARTFORD--TURNING TITANIUM C-120AV, 1200 RPM, .020" FEED, 1/32" DEPTH--REX 49 OUTPERFORMED T-5.
CLEVELAND--CUT-OFF TOOL CUTTING 3/4" SQ. T-431 STAINLESS--REX 49 CUT 50-60 PIECES BEFORE RESHARPENING. T-4, T-5, T-8 AND T-15 CUT 10-15 PIECES BEFORE RESHARPENING.
CHICAGO--REX 49 RUNNING 80 PER CENT LONGER BETWEEN SHARPENING FOR TURNING NICKEL SILVER ALLOY AND 50 PER CENT LONGER FOR TURNING MAGNETIC IRON THAN T-2.
NEW YORK--TURNING HIGH NICKEL ALLOY--REX 49 OUTPERFORMED T-15.

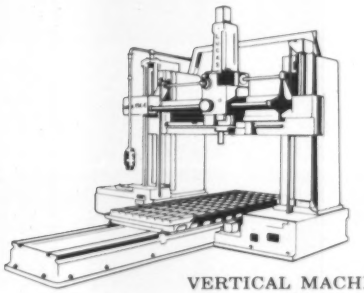
REX 49 is readily available from local Crucible steel centers. Call the Crucible technical service engineer nearest to you to find how you can benefit with REX 49. *Crucible Steel Company of America, Dept. HI06, Four Gateway Center, P. O. Box 88, Pittsburgh 30, Pennsylvania.*

CRUCIBLE STEEL COMPANY OF AMERICA

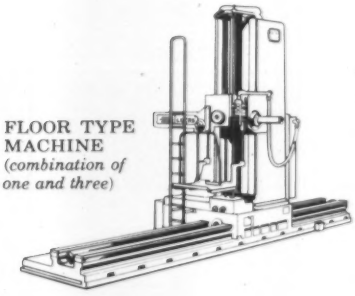




STANDARD HORIZONTAL TABLE TYPE BORING, DRILLING AND MILLING MACHINE *(combination of one and two)*



VERTICAL MACHINE *(combination of one, four and five)*



FLOOR TYPE MACHINE *(combination of one and three)*

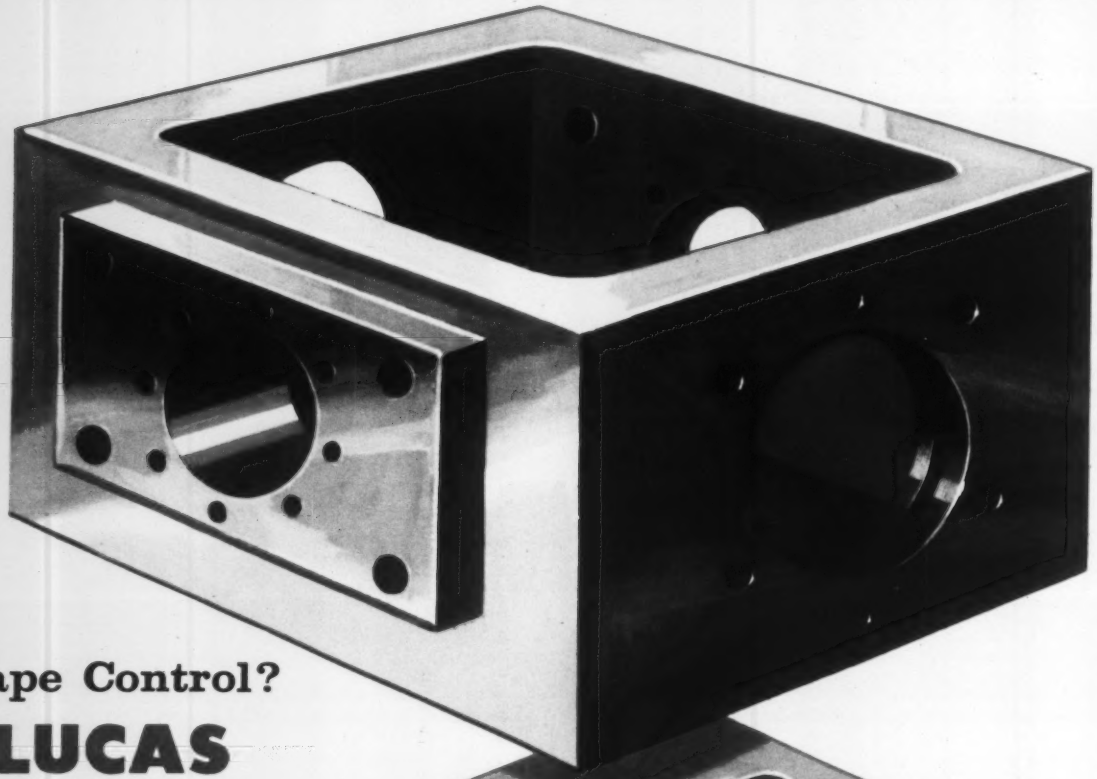
Versatility of Design?

LUCAS

Each Lucas machine—table type, floor type, or vertical—is, in effect, a composite of basic precision-made components, *with integrally cast beds*, assembled to meet your specific requirements. This progressive building-block approach to boring, drilling and milling machine design results in (1) the widest range of field-tested machine models, (2) the same high standards of performance regardless of which type machine you specify, (3) the widest possible range of work with the least number of extra gimmicks and gadgets for so-called "special" jobs. When you want the best that your machine tool dollar can buy, talk to the people who pioneered in the development of the horizontal boring, drilling and milling machine. Lucas Machine Division, The New Britain Machine Company, 12302 Kirby Ave., Cleveland, Ohio.

NOTE: In order to better define the basic components, we have shown main bed castings separated. In actuality, all bed castings are massive integrally cast units providing maximum rigidity for highest precision.

LUCAS
PRECISION

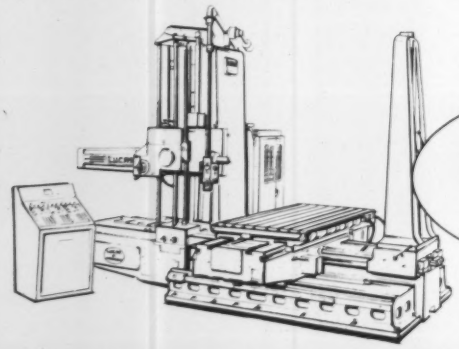


Tape Control?

LUCAS

By offering the widest range of precision table type and floor type boring, drilling and milling equipment . . . by being able to perform the widest range of point-to-point and contouring work . . . by closely coordinating our efforts with the leading producers of numerical controls, Lucas is better able to provide the numerically controlled boring, drilling and milling machines you require.

No longer something to read about and think about, good tape controlled equipment is working hard in more and more plants to provide the competitive edge that spells the difference between profit and loss. A numerically controlled Lucas can help you now to cut lead time in the form of direct and indirect labor, reduce inventory, greatly reduce or eliminate jigs and fixtures, eliminate human error, etc. The list is a long one and your Lucas representative is the man who can spell it out book, chapter and verse. Review your requirements with him for a knowledgeable proposal for a numerically controlled Lucas to fit your specific needs. Lucas Machine Division, The New Britain Machine Company, 12302 Kirby Avenue, Cleveland, Ohio.



LUCAS
PRECISION

Integrity's Role

In his Sept. 7 editorial, Editor-in-Chief Tom Campbell returned to the theme of American integrity. He pointed out previous editorials on this subject brought charges of "politics," then noted, "None of our attempts to explore the hard, tough, and awesome questions of living, working, and surviving today is political; none based on ivory tower thinking. One motive . . . is a feeling that we may be losing characteristics which made our nation great."

Reader response to this new editorial includes the following:

Sir: I think you handled the situation exceedingly well. I cannot help but wonder why our representatives, both in this state and Federal, and, I presume, in many other capitals, have gone so far astray when it comes to thinking about the nation and others before themselves and the power they want to have.—R. W. Harvey, assistant to the president, Sweet's Steel Co., Williamsport, Pa.

Sir—What we need is more of what you have been saying. More is the pity that people other than those who read IRON AGE cannot read what you have been saying.

If those who have their heads in the sand or cannot be bothered with such problems would help correct some of the trouble our country is in, our problems would lessen.—H. J. Wiggans, Richmond, Va.

Sir—I would like to state that I find your comments on the world situation extremely interesting and stimulating. Please keep up your strong editorial policy, for regardless of what sour notes you receive from time to time, you are doing a tremendous job.—J. W. Dini, Battelle Memorial Inst., Columbus, O.

Sir—As a reader of The IRON AGE for many years, I have always been very much interested in reading your editorial. Unless we have the other fellow's point of view, where do we stand?

Perhaps it's the truth that hurts. —Oscar G. Knapp, president, Clark Bros. Bolt Co., Inc., Milldale, Connecticut.

Steelmaking Explosion

Requests continue to come in for reprints of our series of four-color articles on the technological explosion. The next in the series—on forming—will appear in the Oct. 12 issue.

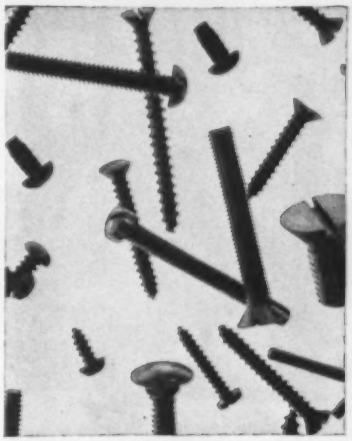
Below are requests for reprints of an earlier article.

Sir—Please send us the article on steelmaking which is the third in The IRON AGE series on "Metalworking's Technological Explosion."—Adline Waldron, district office, Allegheny Ludlum Steel Corp., Washington, D. C.

Sir — Our interest has been retained by your series on metalworking's technological explosion. We would appreciate receiving a complete set of these articles.—G. M. Gordon, technical documentation, Centre D'Information du Nickel, Paris, France.

STANDARDIZE 100% ON SOUTHERN FASTENERS

Southern SPECIALIZES in



Standard Fasteners for METAL

When you specify Southern fasteners, you are adding quality to your products and speed to your assembly operations. Southern Screw is a specialist in plated or plain USA-made standard fasteners for the metal industry. This means dependable quality and reliable service with every order. Buying from Southern also means that your "specials" may be a standard stock item in Southern's 1,500,000,000-piece supply at the Statesville, North Carolina plant.

Write for and examine Southern Screw's current stock list. Then see what 15-year specialization in making quality fasteners can mean to you. Address: Southern Screw Company, P. O. Box 1360, Statesville, North Carolina.

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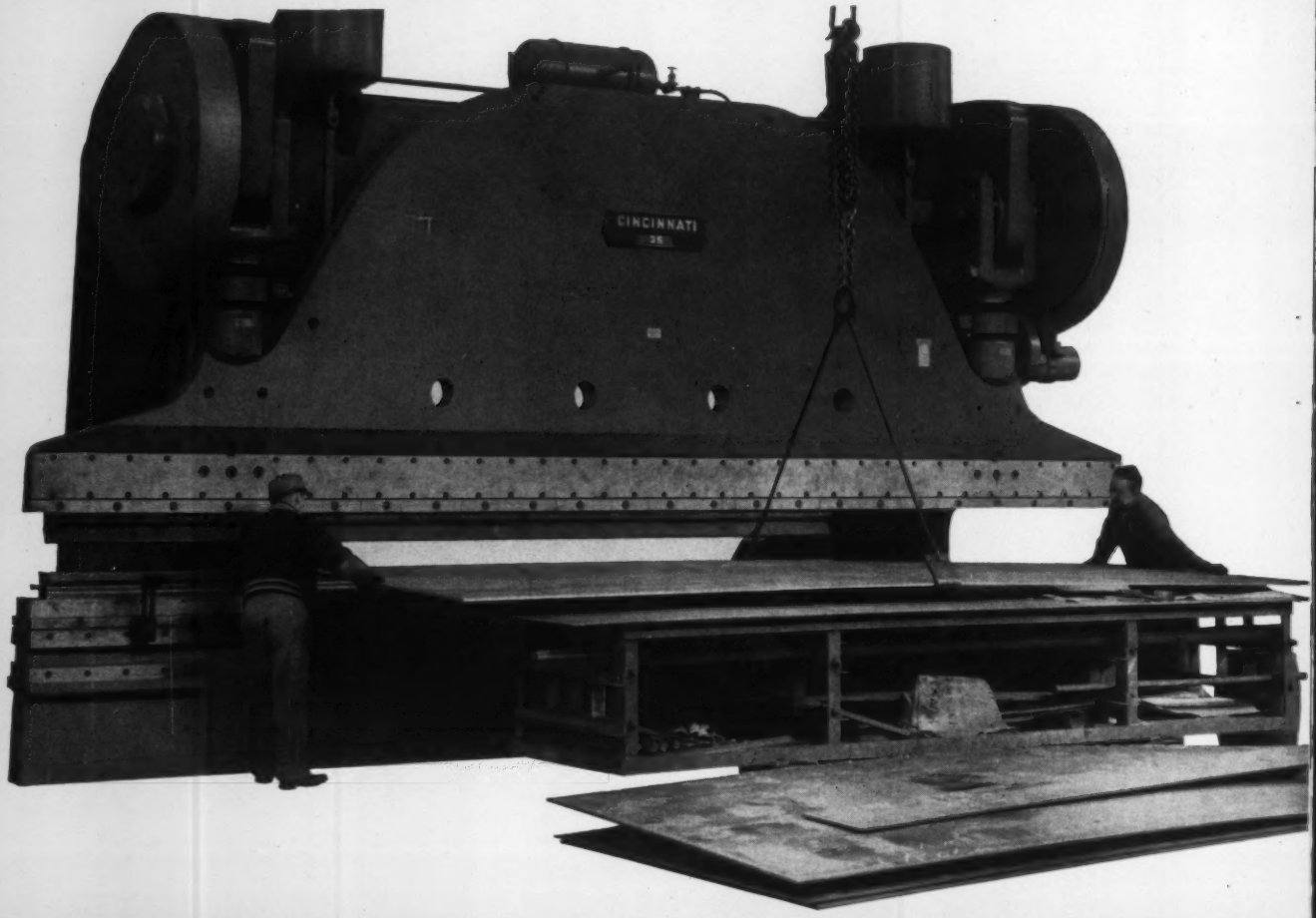
Southern SCREW COMPANY
STATESVILLE • NORTH CAROLINA



CINCINNATI® PRESS BRAKE

gets new business

Bigger jobs, fewer welded seams, less handling, and easier operation—McGregor-Michigan Corporation gets all four advantages from this 36 Series Cincinnati Press Brake.

As a result, "this new brake . . . helps us be more competitive with some of the larger shops," says R. Hilprecht, sales manager of this steel plate fabricating shop.

This is another example of the way Cincinnati Press Brakes and Cincinnati Shears are reducing costs and opening up new business for shops across the country. If you don't have the new catalogs on these machines, both mechanical and hydraulic, please write for them.

Shapers / Shears / Press Brakes

THE CINCINNATI SHAPER CO.

Cincinnati 11, Ohio, U.S.A.

United Kingdom: The Cincinnati Shaper Co., Ltd., Glasgow, Scotland

Reporter at Work

Staying on top of the automotive industry keeps a reporter on the go under normal circumstances.

But Al Fleming, our Detroit Editor, has been moving on a dead run for the past several weeks. This is the preview season for new cars. It is also time for labor contract negotiations in the auto industry. Interviews with Pontiac's S. E. "Bunky" Knudsen and other industry executives for this week's cover story (Auto Industry Goes Into "Try Out" Phase, p. 55) were sandwiched between the previews and labor coverage. Catching the executives wasn't easy. They were just as busy in these same areas.

Picket Line—When Al and nationally-known photographer Joe Clark arrived at Pontiac's gates, they found their way barred by pickets. It was the first day of the strike by General Motors workers.

Pickets harbor suspicions about photographers, dating back to the early days of organizing the industry. But our men put the pickets at ease with a friendly "How's it all going?" Still, the photographer gathered up his equipment and moved quickly through the gates.

Crowded Schedule—Once inside, the interview and picture-taking went quickly—it had to. As is typical of executives everywhere, Mr. Knudsen's schedule was crowded —and, of course, the pickets were on his mind.

As Al and Joe left their identification badges with the receptionist, she remarked on how well behaved the pickets were. "Much more gentlemanly than in previous strikes," she noted, with experience of a strike veteran.

That was apparent outside, also. Although on strike, pickets hadn't lost their loyalty to Pontiac. As reporter and photographer drove from the plant, one picket pointed at their car (a competitive make). He asked jeeringly, "How come you ever bought that thing?" Al didn't answer, but just then his brakes squeaked and the picket said, "Why don't you kill it? It's dying."

Who says workers don't take pride in their products?

Global Reporting

This week on p. 62 you'll find an on-the-scene report by Editor G. F. Sullivan on the Seventh European Machine Tool Exhibition held earlier this month in Brussels.

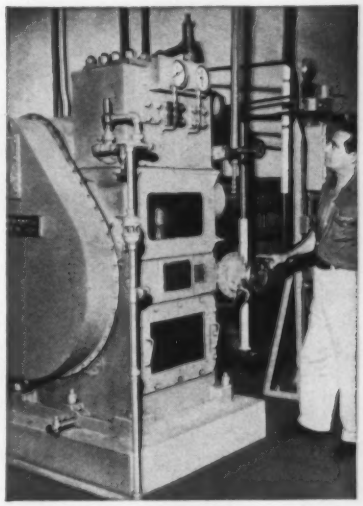
It's one of a number of articles you can expect from Editor Sullivan's most recent month-long tour of metalworking plants and people in Western Europe.

Berlin Diary—His latest tour of the world metalworking scene, when completed, will have taken him to Belgium, West Germany, France, Switzerland and England. The report we await with most interest is his analysis of how West Berlin metalworking plants are holding up during the latest East-West struggle in the cold war.

To keep metalworking management abreast of world business developments IRON AGE editors have logged an amazing amount of foreign travel this year.

Around the Globe—In March, Editor - in - Chief Tom Campbell visited Japan and the Far East for a first hand report on steel and metalworking plants and trade possibilities in the Orient. Bracketing his stories from the Orient were Tom's reports on the metalworking outlook in Canada and South America.

In late spring, managing editor E. C. Beaudet visited machine tool, automotive, and steel plants in West Germany. The result: A seven-part series on the phenomenal post-war growth of the West German economy as a whole and its metalworking industry in particular.



13 years... no downtime... no pressure deviation

For thirteen years, at RCA Victor Mexicana in Mexico City, this Aldrich-Groff Powr-Savr Pump has been delivering without a single unscheduled shutdown. Hydraulic presses are fed a water-oil emulsion at a steady 1800 psi. Pump provides stepless straight-line capacity control from zero to rated output. Pressure adjustment is automatic. Constant pressure has been maintained; any variation would have hiked reject rates. Accuracy and dependability of this calibre have enabled consistently high product quality, full production, maintenance of stringent delivery schedules.

You may need the un-ordinary performance an Aldrich-Groff variable stroke pump can give you. Write Aldrich Pump Company, 8 Pine Street, Allentown, Pa., for pump data or assistance in specifying— 5 to 2500 hp, up to 50,000 psi. At any rating, Aldrich Pumps are tough because . . .

THE TOUGH PUMPING PROBLEMS GO TO

ALDRICH

SUBSIDIARY OF INGERSOLL-RAND

ROUNDING UP MAVERICKS IN YOUR STEEL CORRAL

runs up cost of possession

The cowboy on the overhead crane . . . the range rider on the fork-lift . . . both cost you money when they're working-over piles of steel in storage, rounding-up the right grade in the right size for the job.

Handling and rehandling steel inventory adds cost to your product . . . can even damage steel to the scrapping point.

Consider this cost-reducing answer . . .

Use the complete stocks and first-step processing services of your nearby steel service center just as if they were your very own. Convenience, availability and less handling are augmented by actual dollar-saving economies.

To help your production and cost accounting people figure the *true cost* of steel stocks, ask your steel service center salesman for the booklet, *What's Your Real Cost of Possession for Steel?* Or write to Steel Service Center Institute.

COST OF POSSESSION . . . *to determine your own cost of possession for steel in inventory, consider all these factors:*

Cost of capital: inventory, space, equipment — Cost of operation: space, material handling, cutting and burning, scrap and wastage — Other costs: obsolescence, insurance, taxes, accounting

YOUR STEEL SERVICE CENTER

STEEL SERVICE CENTER INSTITUTE

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Convenient to every steel user, steel service centers are customer-oriented, technically competent, fully equipped for fast delivery of steel in any type, form, and quantity.

Steel

STEEL SERVICE CENTER INSTITUTE

COMING EXHIBITS

Truck Body and Equipment Assn., Inc.—Oct. 2-4, 14th annual meeting and show, Sherman Hotel, Chicago.

American Society for Metals—Metal Show, Oct. 21-27, Detroit. Society headquarters, Metals Park, Novelty, O.

Fleet Maintenance Exposition—Oct. 23-26, New York Coliseum.

Metal Show — Oct. 23-27, Cobo Hall, Detroit. American Society for Metals.

Packaging Machinery Show—Nov. 7-10, Cobo Hall, Detroit. (Packaging Machinery Mfrs. Institute, 342 Madison Ave., New York 17.)

Marine Supplies & Equipment Show—Nov. 15-17, Hotel Roosevelt, New York City.

MEETINGS

OCTOBER

American Gas Assn. — Annual meeting, Oct. 1-4, Dallas. Assn. headquarters, 420 Lexington Ave., New York.

American Machine Tool Distributors Assn.—Annual meeting, Oct. 4-6, Penn-Sheraton Hotel, Pittsburgh. Assn. headquarters, 1500 Massachusetts Ave., N. W., Washington, D. C.

Porcelain Enamel Institute — Annual meeting, Oct. 4-8, The Greenbrier, White Sulphur Springs, W. Va. Institute headquarters, 1145 19th St., N. W., Washington, D. C.

American Society of Mechanical Engineers—Fuels conference, Oct. 5-7, Dinkler Tutwiler Hotel, Birmingham.

Society of Plastics Engineers, Inc.—Regional technical conference, Oct. 5, Hotel Lafayette, Buffalo.

American Society of Industrial Designers—Annual meeting, Oct. 5-8, Santa Catalina Island, Calif.

Rail Steel Bar Assn.—Semi-annual

MEETINGS

meeting, Oct. 9-10, Drake Hotel, Chicago. Assn. headquarters, 38 S. Dearborn St., Chicago.

Rolling Mill Machinery and Equipment Assn. — Annual meeting, Oct. 9, Duquesne Club, Pittsburgh. Assn. headquarters, Farmers Bank Bldg., Pittsburgh.

Magnesium Assn. — Annual convention, Oct. 22-24, Belmont Plaza, New York. Assn. headquarters, 122 E. 42nd St., New York.

National Assn. of Sheet Metal Distributors — Annual meeting, Oct. 22-25, Hotel Dennis, Atlantic City, N. J. Assn. headquarters, 1900 Arch St., Phila.

American Coke & Coal Chemical Institute — Annual meeting, Oct. 23-24, The Greenbrier, White Sulphur Springs, W. Va. Institute headquarters, 711 Fourteenth St., N. W., Washington, D. C.

Wire Assn. — Annual convention, Oct. 23-26, French-Lick Sheraton, French Lick, Ind. Assn. headquarters, 453 Main St., Stamford, Conn.

Society for Non-Destructive Testing—National convention, Oct. 23-27, Detroit. Society headquarters, 1109 Hinman St., Evanston, Ill.

National Tool & Die Manufacturers Assn. — Annual convention, Oct. 24-28, Huntington-Sheraton Hotel, Pasadena, Calif. Assn. headquarters, 907 Public Square Bldg., Cleveland.

American Society of Tool Engineers — Semi-annual conference, Oct. 26-27, The Royal York Hotel, Toronto. Society headquarters, 10700 Puritan Ave., Detroit.

Industrial Truck Assn. — Annual meeting, Oct. 29-31, The Greenbrier, White Sulphur Springs, W. Va. Assn. headquarters, One Gateway Center, Pittsburgh.

Material Handling Institute, Inc.— Annual meeting, Oct. 29-31, The Greenbrier, White Sulphur Springs, W. Va. Institute headquarters, One Gateway Center, Pittsburgh.

PRE-PROCESSING...

cost-cutting benefit offered by your steel service center

First-step pre-delivery processing is available from well-equipped steel service centers handy to you. Utilize their experienced people and their modern precision equipment to answer your part-time need for costly machinery . . . and men to run it.

Services which steel service centers in your area offer include: burning, precision shearing, slitting, flame-cutting, sawing, leveling and edging.

Pre-delivery processing is backed up by expert steel experience to help you operate economically, yet produce to high standards. Your "cost of possession" of steel is reduced, too. Call on your local steel service center for recommendations, service, and delivery.

YOUR STEEL SERVICE CENTER

STEEL SERVICE CENTER INSTITUTE

Terminal Tower • Cleveland 13, Ohio

Convenient to every steel user, steel service centers are customer-oriented, technically competent, fully equipped for fast delivery of steel in any type, form, and quantity.

Steel

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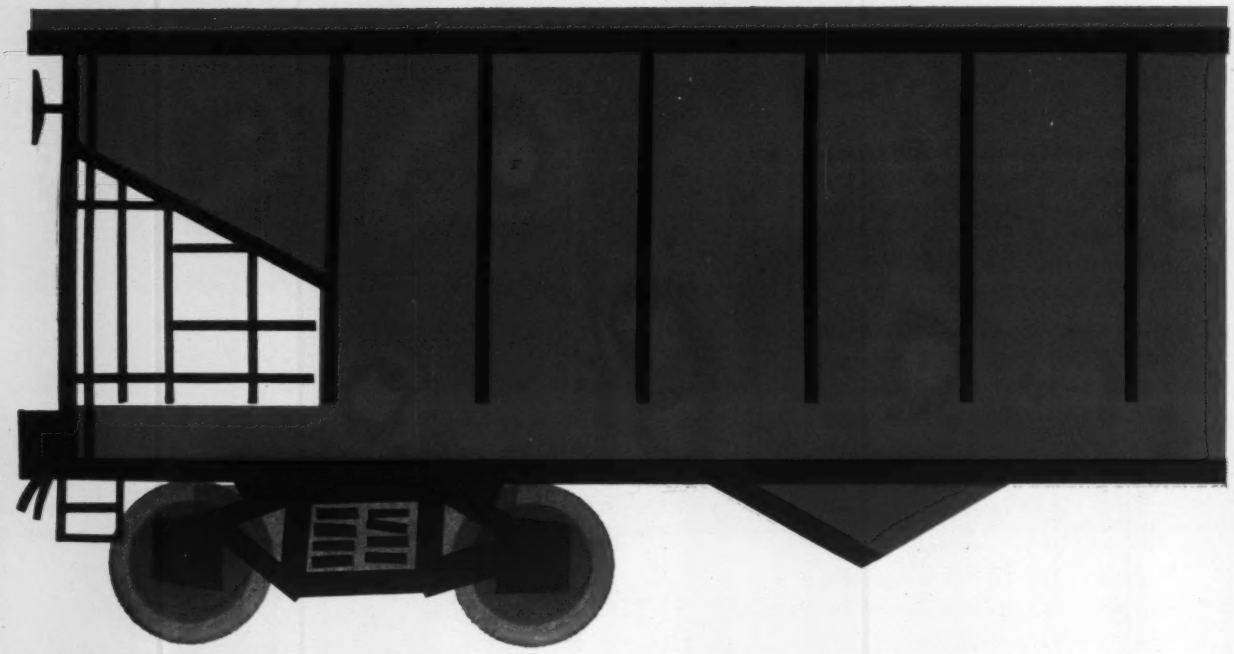
How to design a 30% lighter body



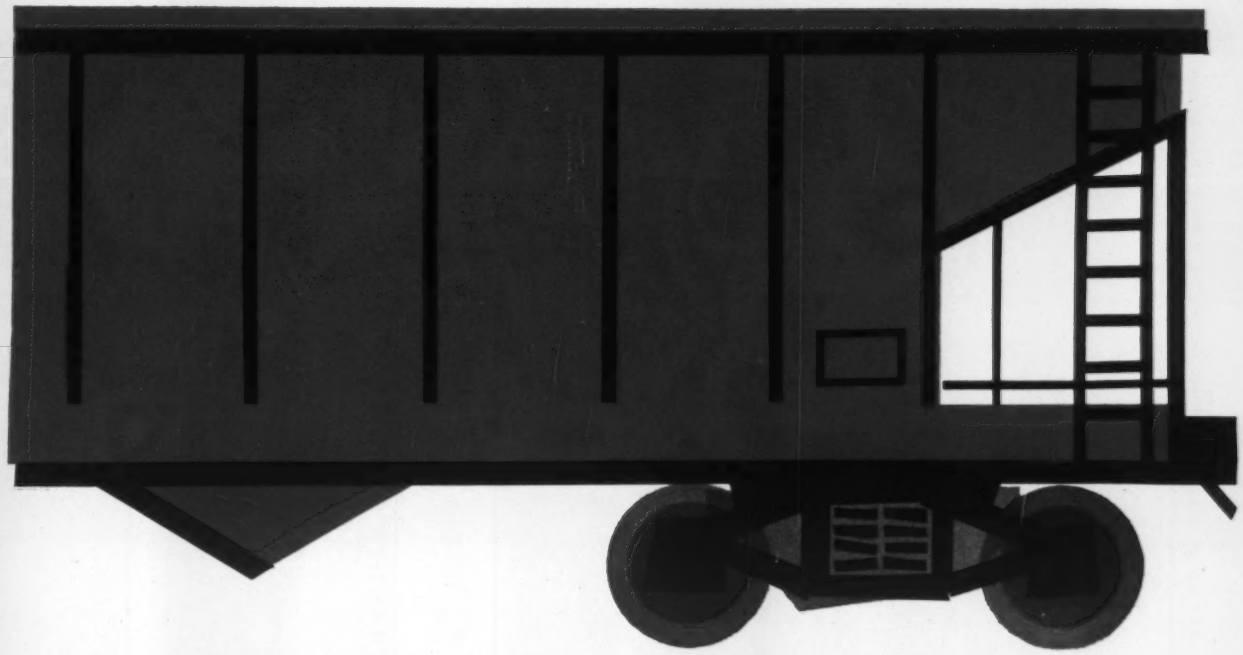
Here is a 70-ton hopper car that has yet to be built . . . but dramatic savings in weight at a nominal material cost can be made by designing it with USS "T-1" type A Constructional Alloy Steel Plate and USS Quenched and Tempered "T-1" type A Structural shapes now available.

Save 8,250 pounds of steel! A standard 70-ton capacity hopper car body fabricated in high-strength low-alloy steel and carbon steel plates and shapes normally weighs approximately 28,000 lbs. According to a special design study, the substitution of USS "T-1" type A Steel in certain components can result in a weight savings of about 8,250 lbs. The material cost for this design utilizing USS "T-1" type A plates and structurals, based on mid-1961 prices, is only $230 more than the present conventional hopper car. This means that a slight increase in the total cost of the steel itself can accomplish a significant weight reduction of 8,250 lbs.—nearly 30% of the existing body weight. Of greater importance is the potential 6% increase in over-all lading capacity realized through this savings in weight. Additional savings could be expected in hopper cars of greater capacity.

Greater payload offsets initial cost. Every pound of dead weight transported by a railroad is done so at the expense of a pound of potential payload per trip made during the life of a car. With

This mark tells you a product is made of modern, dependable Steel.

with USS "T-1" type A Steel



additional lading capacity, greater payloads possible would quickly offset the small additional steel cost involved. USS "T-1" type A Steel's minimum yield strength of 100,000 psi permits its use in thinner sections with accompanying weight reduction. Secondary benefits which accrue through the use of this exceptional constructional alloy steel include improved abrasion resistance, greater ability to withstand impact, and lower maintenance costs. All of these factors promote longer, economical service performance.

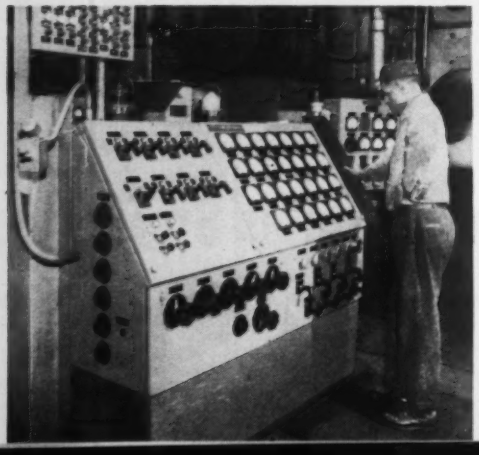
Our new quenched and tempered structural alloy shapes are now available in USS "T-1" and "T-1" type A Steels in the more commonly used sizes of wide flange (CB's) and American Standard beams, channels, equal angles and unequal angles.

For more information on USS "T-1" and "T-1" type A Steels, or on the new USS Quenched and Tempered Structural Shapes, write United States Steel, Room 6386, 525 William Penn Place, Pittsburgh 30, Pennsylvania. USS and "T-1" are registered trademarks.

United States Steel Corporation • Columbia-Geneva Steel Division • Tennessee Coal and Iron Division • United States Steel Supply Division • United States Steel Export Company

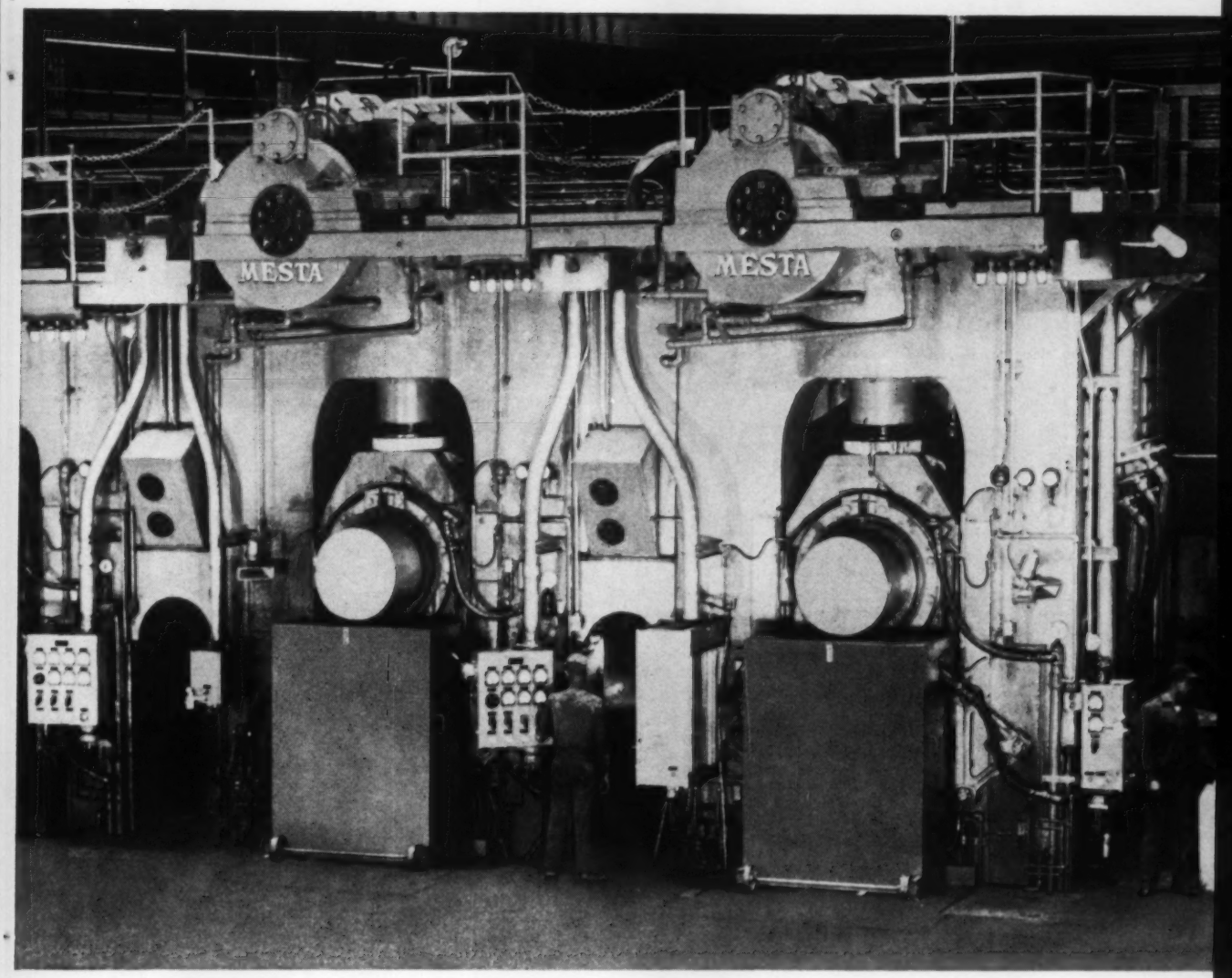
United States Steel USS

World's First 6-Stand Tin Plate Mill . . . Powered and Automated by Westinghouse



Above—Front view of 6-stand mill showing individual stand controls and Master Roller's desk.

At Left—Close-up of Master Roller's Desk. All supervisory mill controls are centralized here.



Speed: 7,250 feet per minute
Size: 6-stand 52″ tandem cold mill
Power: 34,900 main drive hp
Thickness Range: .035 to .0035

Early this year, The Youngstown Sheet & Tube Company began rolling tin plate from a new mill at Indiana Harbor. The mill is the largest and fastest such facility installed to date, and also the most completely automated installation of its kind.

All six stands are governed by Magamp magnetic amplifiers, which accurately regulate the response of motors and power supply generators. Automatic gauge control with completely static circuitry assures uniform strip through each stand, and maximum on-gauge finished strip at maximum rolling speed. Every factor in the rolling process is supervised by instruments and controls at the master console. Data logging equipment provides a complete record of gauge, width and inspection information for each coil as it passes through the mill. Data is accumulated as the coil is run, and automatically typed for order processing and record keeping. A total of 18 items of information are recorded plus inspection faults detected.

Virtually all control circuitry is entirely static. Magamp regulation requires no interposing exciters or complex damping circuits. This basic simplicity assures extremely high accuracy and reliable performance throughout the rolling cycle.

From the planning stage to start-up of the new mill, a *(continued on next page)*

First 6-Stand Tin Plate Mill

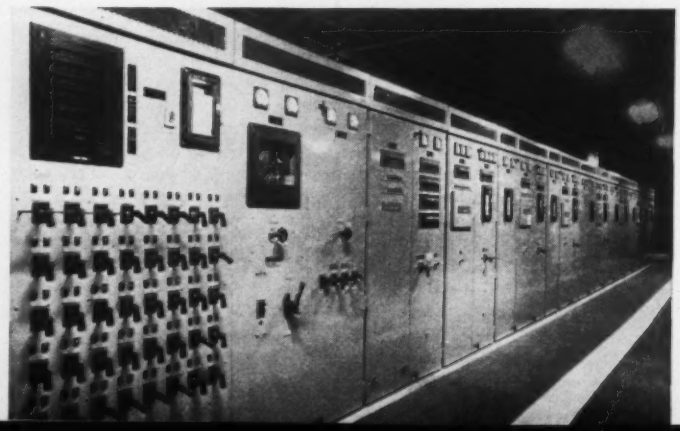
One of the three main power supply Westinghouse Motor-Generator sets located in the mill area. This MG set has a total of 8800 kw, is driven by a 12,000 hp synchronous motor.

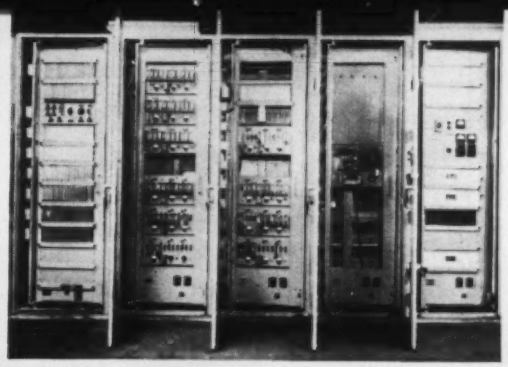
Below—Drive view of Youngstown Sheet and Tube's new 6-stand tandem cold mill. Westinghouse main mill drives range from 3000 hp (Stand #1) to 7500 hp (Stand #6). Twin, twin double armature and twin triple armature drives plus reel drive total 34,900 hp.

Westinghouse project coordinator followed every aspect of the job, working with the machinery builder and mill personnel. Weeks before start-up, Westinghouse specialists began training Youngstown crews in operating the complete mill and its control systems. The reward for these efforts was a remarkably trouble-free start-up.

The Westinghouse team of specialists in power and controls accepts one-source responsibility right from the start. Contact your Westinghouse sales engineer for details, or write Westinghouse Electric Corporation, P.O. Box 868, Pittsburgh 30, Pa.

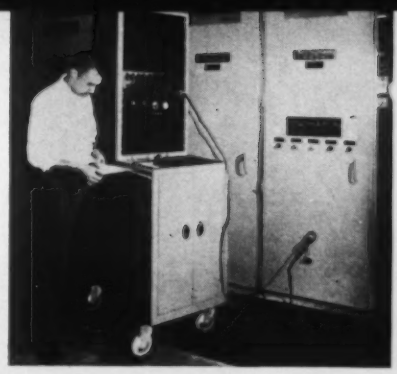
You can be sure . . . if it's Westinghouse.





Westinghouse's PRODAC* all-static system handles automatic gauge control and total data logging functions for the high-speed mill. Readout covers 18 points of information plus recording any inspection faults detected.

*Trademark

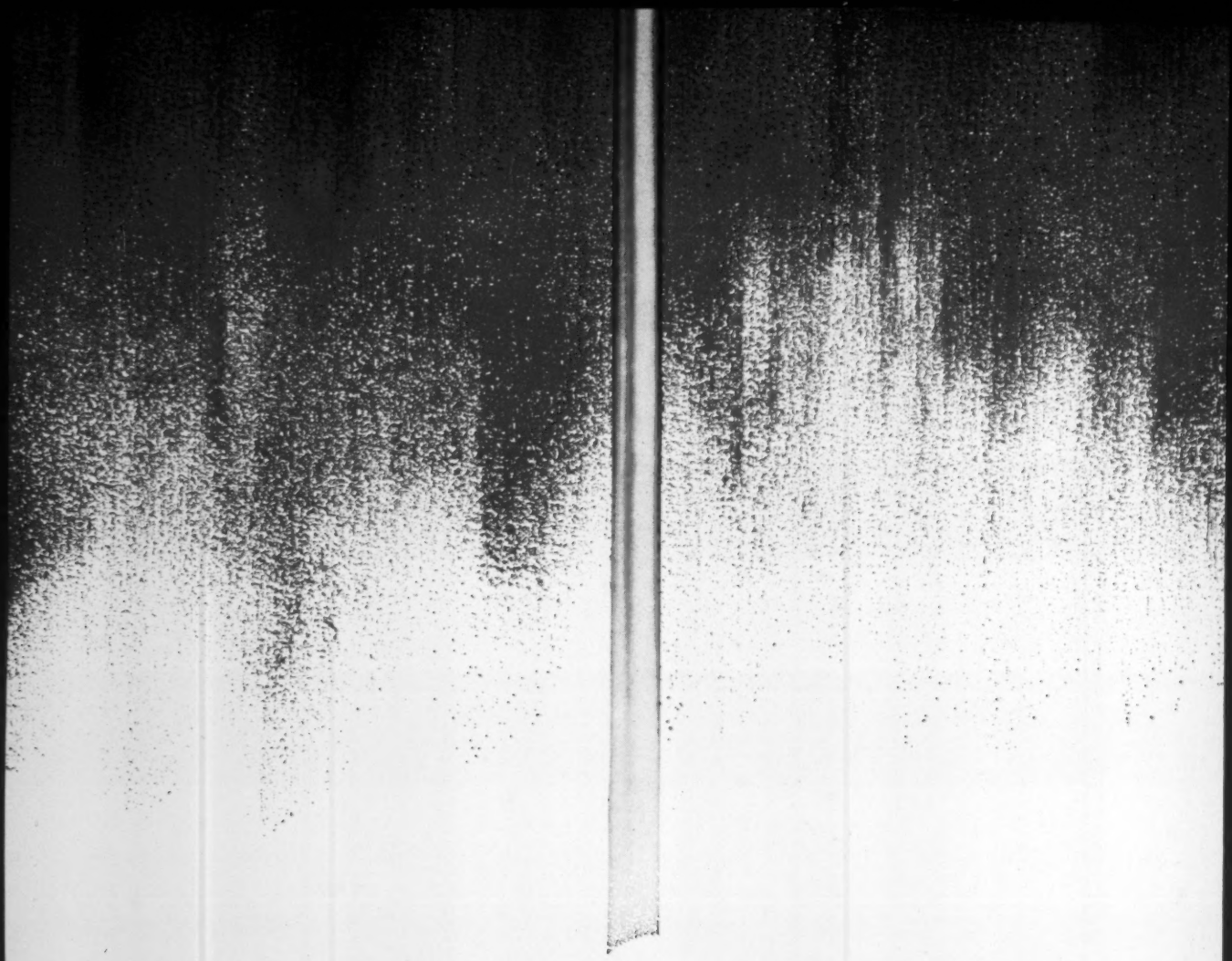


Westinghouse PRODAC design incorporates mobile test console pictured. Unit permits convenient changes in mill set-up, or quick circuit checks through front mounted plug-in shown.

Interior view of control house on mill floor. Cabinets shown house Westinghouse Main Drive Controls.

View of Westinghouse equipment located below mill floor. The only auxiliary rotating equipment required for main drive is 400 cycle alternator, constant potential exciter and voltage reference exciter shown in the center of photo.

Westinghouse



OXYGEN
GOOD FOR STEELMAKING– BAD FOR REFRACTORIES

Since the beginning of oxygen steelmaking in North America, Harbison-Walker has contributed to the success of the processes through the development of several entirely new refractories, and the improvement of others to give them longer life under the more severe conditions that accompany oxygen operations.

FOR THE BASIC OXYGEN PROCESS: Harbison-Walker developed entirely new types of refractories. These products—OXILINE H and OXILINE CL tar-bonded brick, and H-W OXIMIX—hold many production records, and are firmly established as standards of the industry. Harbison-Walker is the only manufacturer who has supplied linings to all basic oxygen process shops on the North American continent.

IN OPEN-HEARTH FURNACES: The introduction of high volumes of oxygen speeds the refining process, but also adds materially to the wear and tear on refractories. To withstand these severe conditions, Harbison-Walker developed a high purity (over 98% MgO) high density magnesite from which to produce special METALKASE refractories for the most vulnerable parts of the furnace. These new refractories will augment the present superior life of such well known products as EXKASE MAGNEX OHR, METALKASE MAGNEX H, H-W PERIKLASE and the monoliths H-W C-MIX and H-W GUNSHOT, and will continue to aid steelmakers in maintaining the high production rates that the oxygen lance makes possible.

These Harbison-Walker products, representing today's most-advanced practices, are being constantly improved through the use of better raw materials, closer quality control and continuous studies of operating experience.

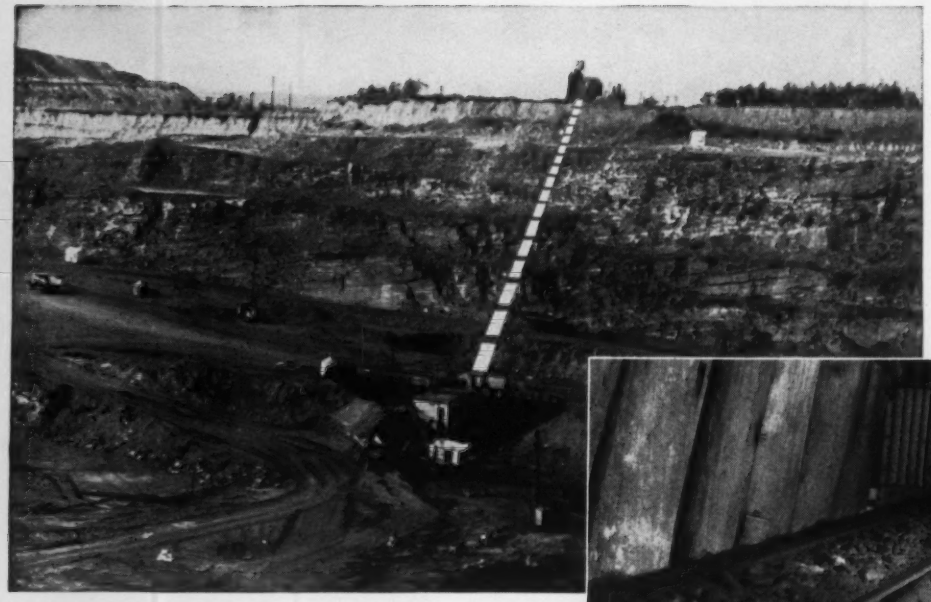
HARBISON-WALKER REFRACTORIES COMPANY AND SUBSIDIARIES

GENERAL OFFICES: Pittsburgh 22, Pa.

World's Most Complete Refractories Service

HW 61-24

40 STORIES *from Pit to Surface*



...IT'S R/M

CONVEYOR BELT FOR LONG LIFTS!

Easy troughability, flexibility, super-strength synthetic cords, high wear-resistance—make R/M Conveyor Belts ideal wherever long lifts at high tensions are required. The installation shown here, for example, was a quarter-mile conveyor with a lift from pit to surface loading station nearly as high as a 40 story building. An R/M conveyor belt made an exceptional record on this rugged haul. There's an R/M heavy duty conveyor belt for every materials handling requirement . . . each engineered to haul fuller, heavier loads—and *last longer*. With proper engineering, for example, you can increase hauling capacity up to 60% with Ray-Man Conveyor Belt and 45° idlers! Ask your R/M representative about other R/M Conveyor and elevator belts, about advantages of extra-flexible, double compensated, rip-resistant Ray-Man . . . about Homocord, the extra-cushioned belt for unusually abusive shock loading conditions, or about the Wedlok metal fastener splice which avoids vulcanizing splices. Any R/M Conveyor Belt with "XDC" cover means extraordinary resistance to wear and tear, longer life—"More Use per Dollar." Write for Bulletin M302 and Catalog CB25.

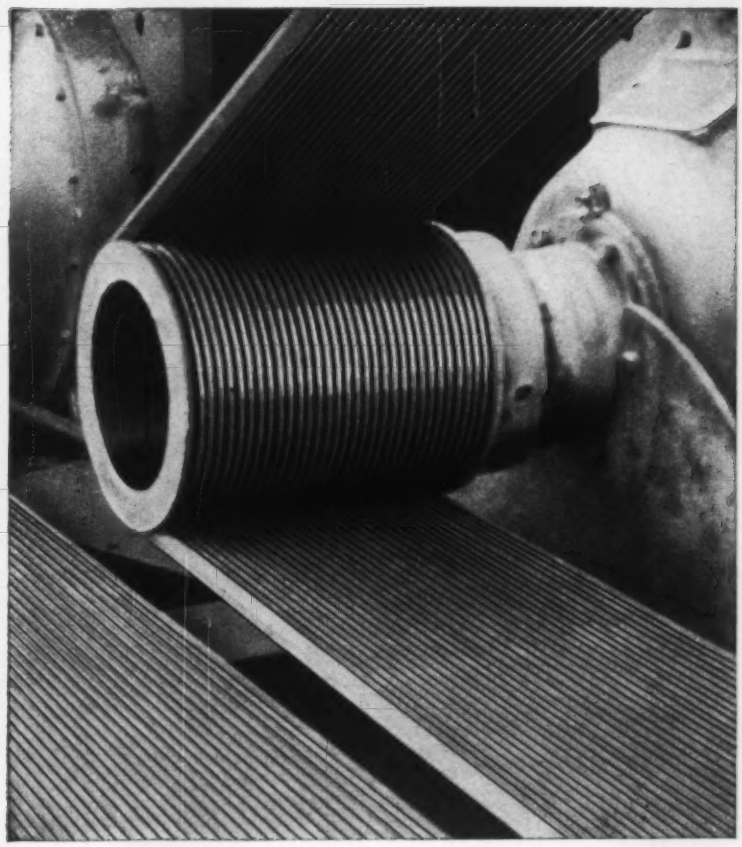
ENGINEERED RUBBER PRODUCTS ..."MORE USE PER DOLLAR"

RM

RM1018

RAYBESTOS-MANHATTAN, INC.

MANHATTAN RUBBER DIVISION, PASSAIC, NEW JERSEY



R/M POLY-V® DRIVE

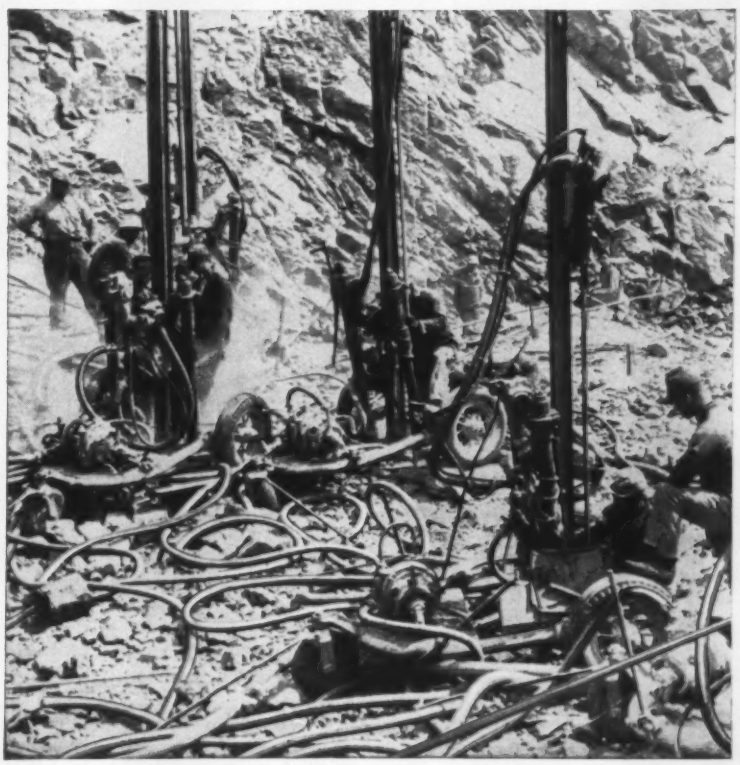
More Power—

in Less Space

. . . with Reliability

A *single unit* V-ribbed belt across full width of the drive-sheave—*not* an assembly of V-belts—enables patented Poly-V to deliver much *more* power in the same space as a V-drive . . . or *equal* power in much *less* space! Single unit belt design also eliminates belt "length matching" problems . . . minimizes equipment down-time and belt replacement costs. Belt speed ratios remain constant from *no* load to *full* load to provide the smoothest running, coolest running—*longest wearing* drive you can install. Maintain groove shape. Just two sections of Poly-V Belt meet every heavy duty power transmission requirement. Write for Bulletin M141, or call your R/M Distributor.

CONVERT TO RM POLY-V and BE SURE!



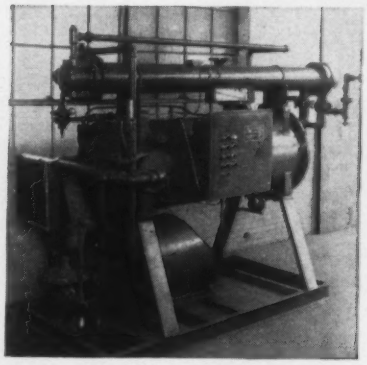
HOMOFLEX HOSE

more flexible, weighs less than any hose for equal pressure

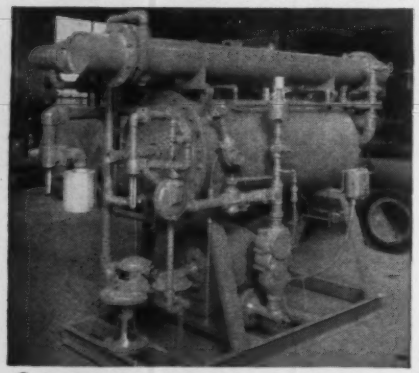
- **SUPER-STRONG**
- **PRECISION BUILT**
- **NO PRE-SET TWIST—WILL NOT KINK**
- **INSEPARABLE TUBE-TO-COVER BOND**
- **UNIFORM INSIDE AND OUTSIDE DIAMETERS**
- **EASIER, SAFER COUPLING**

Strong, lightweight, and "flexible as a rope"—Homoflex is the easiest handling hose and lasts longer. Made in types for air, water, other fluids and gases. Ask about other types of R/M rubber hose for your job applications. Write for Bulletins M620 and M694.

Which of these 3 KEMP GAS GENERATORS *do you need in your plant?*

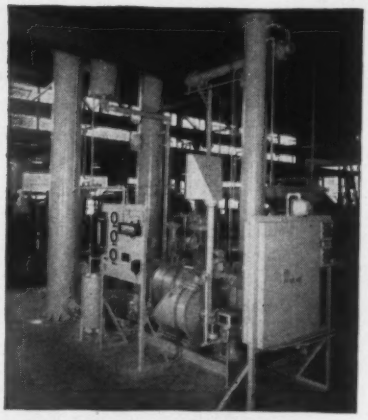


1 KEMP INERT GAS GENERATOR
—for working non-ferrous metals. Produces inert gases for use at low or high pressure, desiccated or unprocessed. Kemp gives you low-cost gas generation, completely automatic operation. Premixing in exclusive Kemp Carburetor and constant analysis assures highest thermal efficiency.



2 KEMP ATMOS GAS GENERATOR
—for working low-carbon steels. For gases low in carbon dioxide. As in all Kemp Gas Generators, test burner permits checking for proper combustion characteristics before igniting burners. Another safety feature: automatic fire-checks guard against flashback.

3 KEMP NITROGEN GENERATOR
—for working high-carbon steels. Completely eliminates CO_2 from gas, produces 99+% nitrogen. Features the easy start-up typical of all Kemp Generators. Vernier dial can be locked in position to maintain exact fuel-air ratio without further control manipulation.



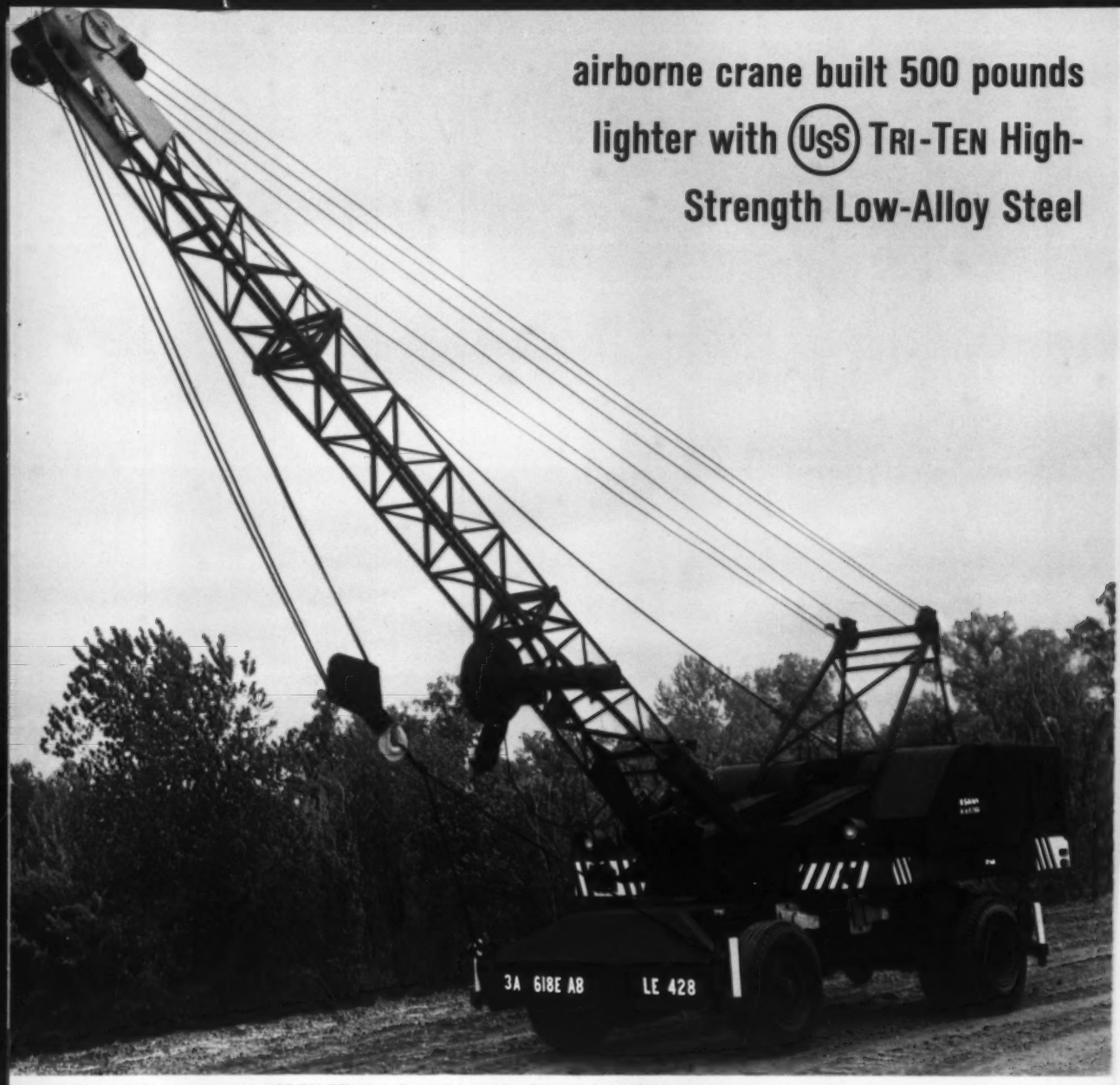
The Kemp representative in your area can advise you on the type and size of generator to best solve your problem. Talk to him or write: The C. M. Kemp Manufacturing Company, 405 E. Oliver St., Baltimore 2, Maryland.

It always pays to come to

KEMP OF BALTIMORE

THE C. M. KEMP MANUFACTURING COMPANY
405 E. Oliver St., Baltimore 2, Md.

airborne crane built 500 pounds lighter with USS TRI-TEN High-Strength Low-Alloy Steel



Lightweight crane built strong with USS TRI-TEN High-Strength Low-Alloy Steel. Designed for the U.S. Army Corps of Engineers, Ft. Belvoir, Virginia. Builder: Koehring Co., Milwaukee, Wisconsin.

This air transportable, air droppable U.S. Army crane had to be strong enough to lift 7 tons but light enough to be parachuted into a combat area. The Koehring Company of Milwaukee, Wisconsin, solved the problem with USS TRI-TEN High-Strength Low-Alloy Steel.

By using USS TRI-TEN Steel in the turntable, the lower works of the cruiser, and the boom, Koehring designers used only two tons of steel . . . with a clear saving of 500 pounds. Strength was not sacrificed because USS TRI-TEN Steel has a minimum yield point of 50,000 psi.

USS TRI-TEN Steel is well known as one of the most weldable and toughest high-strength low-alloy steels in the industry. Its superior notch toughness at low temperature makes it ideal for all-weather mobile equipment. TRI-TEN Steel has excellent weldability, good resistance to abrasion, and high atmospheric-corrosion resistance.

For other military vehicles, United States Steel makes extremely tough, rolled alloy armor plate, in addition to a complete line of high strength steels, "T-1" Constructional Alloy Steel, Stainless Steels and carbon steels. For more information, write United States Steel, 525 William Penn Place, Pittsburgh 30, Pennsylvania. USS, "T-1" and TRI-TEN are registered trademarks

United States Steel Corporation • Columbia-Geneva Steel Division • National Tube Division • Tennessee Coal & Iron Division • United States Steel Supply Division • United States Steel Export Company

This mark tells you a product is made of modern, dependable Steel.

USS United States Steel

Towering five stories high, this vertical cooling tower forms a vital part of United States Steel's spectacular new heat treating facilities shown on the next two pages. The forging is placed on a stool which can be rotated. Cooling is accomplished by the use of air or water, as required.

PLEASE LIFT FLAP

This mark tells you a product is made of modern, dependable Steel.

From the cradle to the lathe

New vertical heat-treating facilities handle world's largest rotors

How would you handle a forging that starts out as a 521,000-pound ingot and ends up as one of the world's largest generator rotors weighing 114 tons?

To accommodate forgings like this at its Homestead Works, United States Steel has installed seven new vertical heat-treating furnaces, a cooling tower and a unique "upender" cradle which tilts these large forgings with ease to a vertical position for crane pick-up. The new furnaces rise 25 feet above, and extend 25 feet below the floor. They can accommodate turbine and generator rotors with an overall length of 45 feet maximum and a maximum body diameter of 60 inches.

The vertical heating and cooling equipment allows large rotors to be uniformly heat treated in the upright position after they have been forged and machined.

One of the outstanding jobs for the new equipment was heat treating some of the largest generator rotors ever made. One of these is shown below being machined in the 120-inch lathe after it received its heat treatment. (The smaller rotor suspended from the crane in the big picture at the left is a different forging.)

In forgings such as these, heating and cooling operations must be carefully controlled to assure proper structure in the steel. Using the skill that only time and experience could give him, Al Sauer, a veteran in our Homestead Works, supervises the careful heat treating of these forgings. After heating, they are transferred to the 50′ high cooling tower where they are cooled at controlled rates. Then they go back for further machining, testing, boring, more heat treating, final machining, sonic inspection, and shipment.

United States Steel makes many forgings for all kinds of applications. Here, a team of experts supervises and controls every step of forging production. Let them handle *your* next order. For more detailed information about USS Quality Forgings, write United States Steel, 525 William Penn Place, Pittsburgh 30, Pennsylvania.

United States Steel Corporation, Pittsburgh • Columbia-Geneva Steel, San Francisco • Tennessee Coal & Iron, Fairfield, Alabama
United States Steel Export Company

Shown here are four of the seven new vertical heat-treating furnaces, housed in a modern 125 foot high building, that give United States Steel the ability to handle the largest generator and turbine rotor forgings that can be made.

One of the world's largest generator forgings being machined in our 120-inch lathe. After final machining, it weighed 114 tons.

USS United States Steel

TRADEMARK

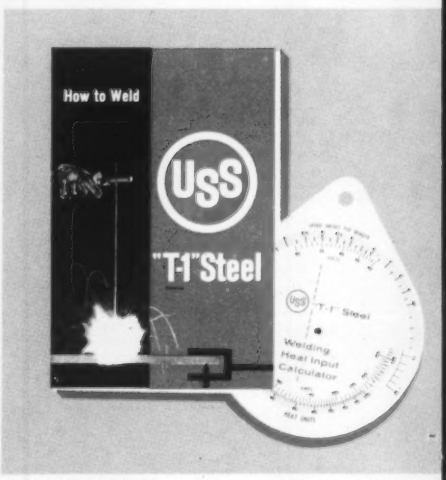
Send for new movie, "How to Weld USS 'T-1' Steels"

This new 18-minute, 16mm color motion picture shows concisely the practices involved in welding USS "T-1" Steels. If you are fabricating "T-1" Steel in your shop, this film and copies of the booklet will be a big help in demonstrating the proper technique to your welders. Fill out the coupon below and indicate the number of booklets you will need.

Included in the booklet is a handy welding heat-input calculator that helps a welder choose the proper welding machine settings. The film, together with the booklet, will help every welder to weld USS "T-1" Steels readily and successfully.

We'll gladly lend you the film and furnish enough free copies of the booklet and heat-input calculator for your shop personnel. USS and "T-1" are registered trademarks.

United States Steel Corporation • Columbia-Geneva Steel Division National Tube Division • Tennessee Coal and Iron Division • United States Steel Supply Division • United States Steel Export Company



United States Steel

USS

United States Steel, Room 6384
525 William Penn Place
Pittsburgh 30, Pennsylvania

Gentlemen:

Please lend me your 16mm color, sound movie, "How to Weld USS 'T-1' Steels." Also, send me _____ booklets of the same title. I understand there is no obligation.

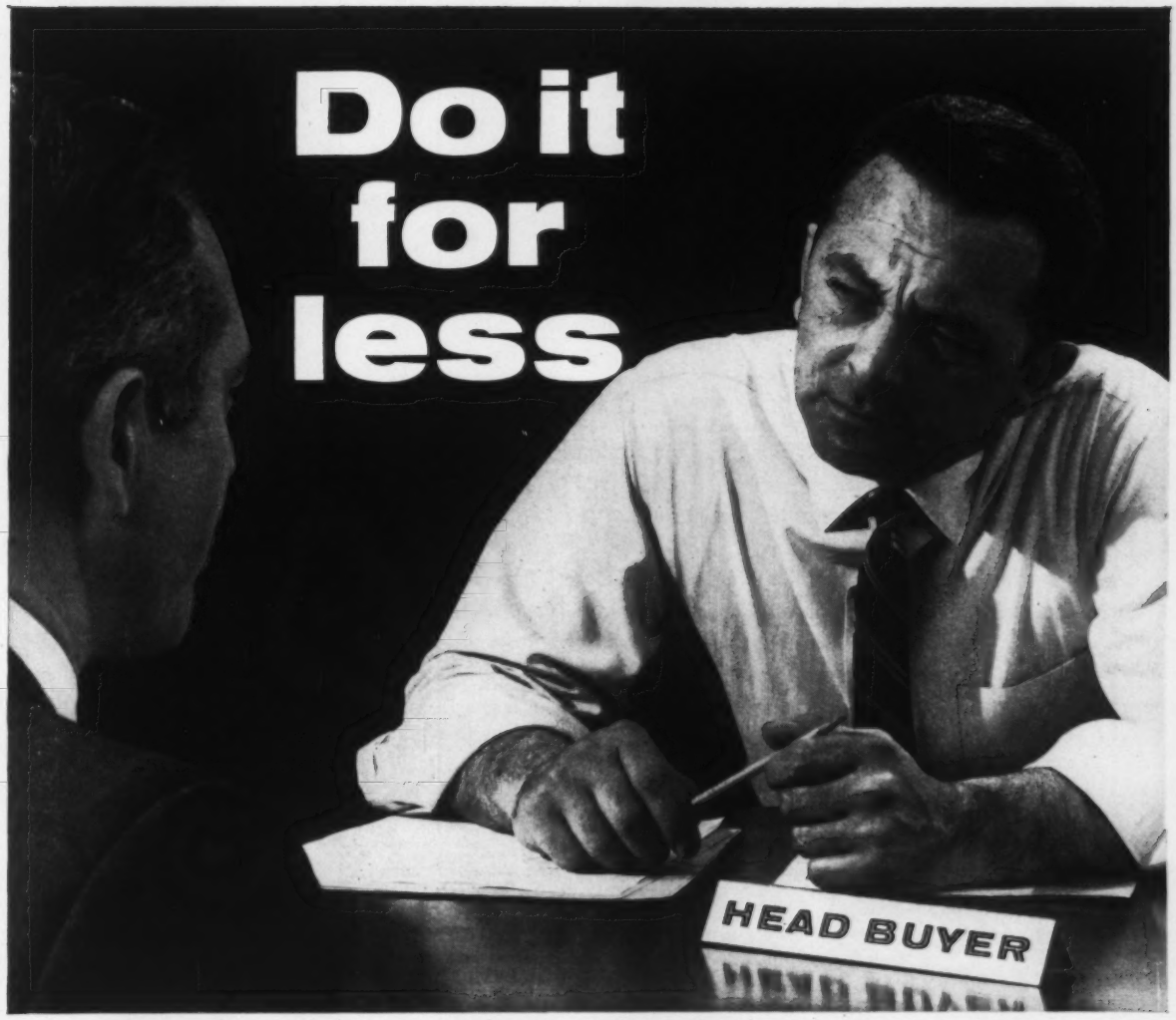
Name _____

Title _____

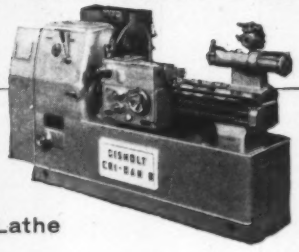
Company _____

Address _____

City _____ Zone _____ State _____



ON A CRI-DAN AUTOMATIC THREADING LATHE



Gisholt CRI-DAN Model B Automatic Threading Lathe

- Sets up in 8-15 minutes for maximum profits on job lots or long runs.
- Produces single- or multiple-start, standard or special form, left- or right-hand, straight or tapered, internal or external threads right up to shoulders, in a matter of seconds.
- Can combine threading with tracing and other machining during the automatic cycle.
- Provides top quality and fine finish in any material in a fraction of the time and/or cost required by milling, grinding, or special taps and dies.

Buyers can't afford to pass up a sales approach based on equipment that cuts threading costs 30-80%.

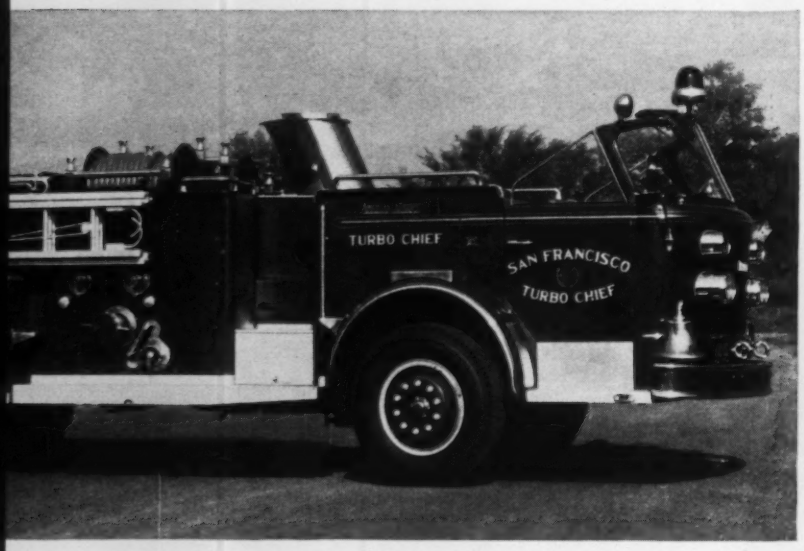
This advantage is attained with the Gisholt Cri-Dan Threading Method—that uses an inexpensive, single-point, carbide tool to cut *quality* threads in *any* material —*automatically!* Now, you can set up in 8-15 minutes and produce *any* type of thread in a matter of seconds. Accessories combine tracing and standard machining with threading for added savings. If you want to thread for less, *call your Gisholt Representative or write for Catalog 1215.*

GISHOLT
MACHINE COMPANY
Madison 10, Wisconsin, U.S.A.

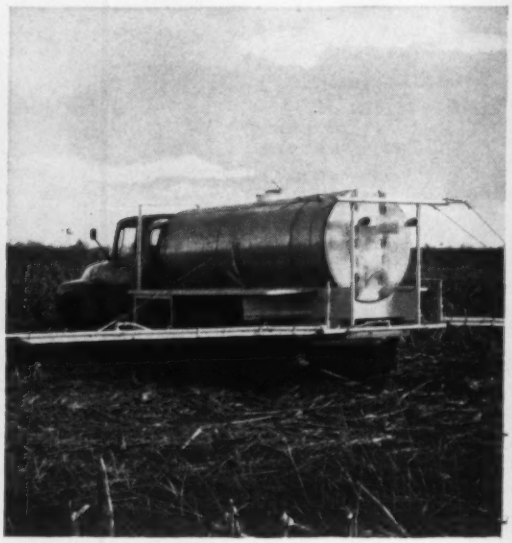
Turret Lathes • Automatic Lathes • Balancers • Superfinishers® • Threading Lathes • Factory-Rebuilt Machines with New-Machine Guarantee

Give your products a competitive edge with USS Stainless Steel

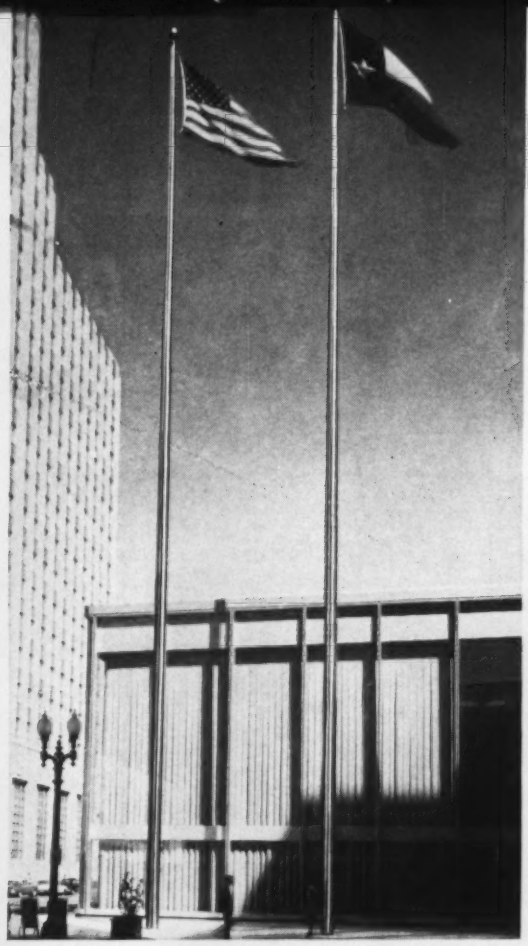
Whether your customer needs industrial equipment or a set of kitchen utensils for his wife, he's looking for quality. If you use Stainless Steel, you give him quality—in terms of long life, attractive appearance, extra strength and resistance to corrosion. Buyers have long known and appreciated the added value Stainless Steel puts into any product—generally anything made of Stainless is easier to sell. There is the matter of selling better performance. Knowledgeable buyers recognize the inherent superiority of Stainless Steel and will settle for nothing less than first-class quality. Here are some of the distinct advantages Stainless offers you: exceptional strength, excellent heat resistance, unsurpassed corrosion resistance and lasting beauty. Your designers can create lighter, stronger, more attractive products. In turn, your marketing men will find that anything made of Stainless Steel has a distinct selling edge, because people know that Stainless is a quality material. Stainless Steel may cost more but it is worth more. For Stainless Steel, call your nearest Steel Service Center. We welcome the opportunity to work with you to develop new uses and markets for Stainless Steel. Write United States Steel, 525 William Penn Place, Pittsburgh 30, Pennsylvania.



Stainless Steel engine powers turbojet fire trucks Seattle and San Francisco have two of the world's most modern fire trucks. Built by American-LaFrance, Elmira, N. Y., they are powered by turbojet engines that weigh only 320 pounds yet generate 330 horsepower. (A piston engine of the same horsepower weighs 2,650 pounds.) Stainless Steel is used here for shafts and turbine blades and in the exhaust stack. Because of Stainless Steel's excellent heat-resisting properties, it's used inside the engine where the temperature reaches 1,200 °F. The stack is Stainless Steel insulated with fiberglass, and will never have to be painted. American-LaFrance is using more Stainless Steel every year for added strength, corrosion resistance and better appearance. Fire trucks must give many years of service under the most demanding conditions, so it is no wonder strong Stainless Steel is being used more often in their manufacture.



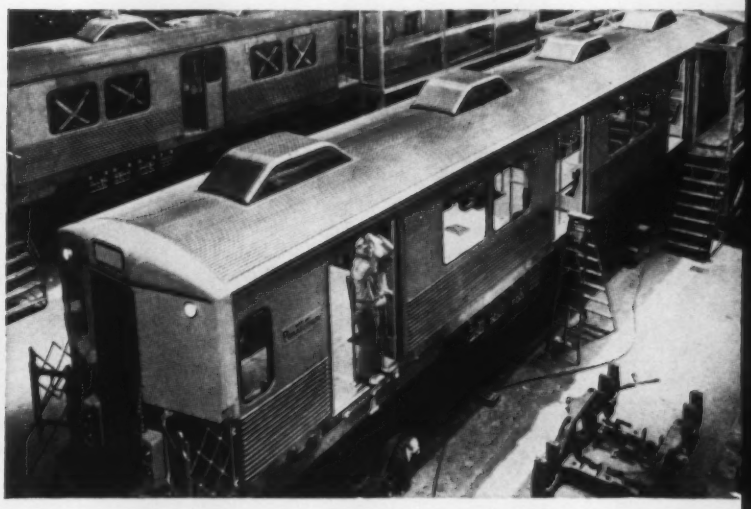
Stainless Steel farm-chemical tanks outlast others 10 to 1 Liquid-chemical fertilizing is widely used on well-managed farms. One problem farmers faced was excessive corrosion from strong chemicals. Solution: tanks of Stainless Steel. Stainless tanks outlast other types 10-1, and they save the farmer time, work and money because they don't corrode and clog up. Tanks, lines, valves, booms and nozzles of Stainless Steel wash clean in jig time and last far longer than other materials.



This mark tells you a product is made of modern, dependable Steel.

Another first for Texas: world's tallest Stainless Steel flagpoles

These 100-foot Stainless Steel flagpoles are the world's tallest. They stand in front of the First City National Bank Building in Houston, Texas. They were fabricated by John E. Lingo & Son, Inc., Camden, New Jersey, and were built to withstand sustained winds of 150 mph. Because they are Stainless, these poles won't corrode and will never need to be painted. They will stand straight and handsome for generations because they're strong as only steel can be. In short, high standards demand high standards.



Stainless commuter cars save Philadelphia millions

Philadelphia has installed a fleet of sleek new Stainless Steel subway-elevated cars built by the Budd Company, Philadelphia, Pa. The city figures the Stainless cars will save some $65,000,000 over the depreciated lifespan of the fleet because they are lightweight, don't require as much power, will need little or no outside maintenance, and will undergo almost no hidden structural deterioration because Stainless Steel resists corrosion so well. All 270 cars in the fleet are now running, and Stainless Steel will keep them looking brand-new for years through all kinds of weather.

Stainless Steel brightens new Union Carbide Building

One of New York's newest office buildings, and one of the most attractive, is the Union Carbide Building. It rises 52 stories over the city and took nearly three years to erect. It owes much of its beauty to curtain-wall panels of Stainless Steel, which will stay attractive through the years because of Stainless' superior corrosion resistance. A passing shower will keep them clean and attractive. More and more, long-lasting Stainless Steel is being used in the most modern architecture because of its strength and corrosion resistance. Architects: Skidmore-Owings & Merrill, New York, N. Y.

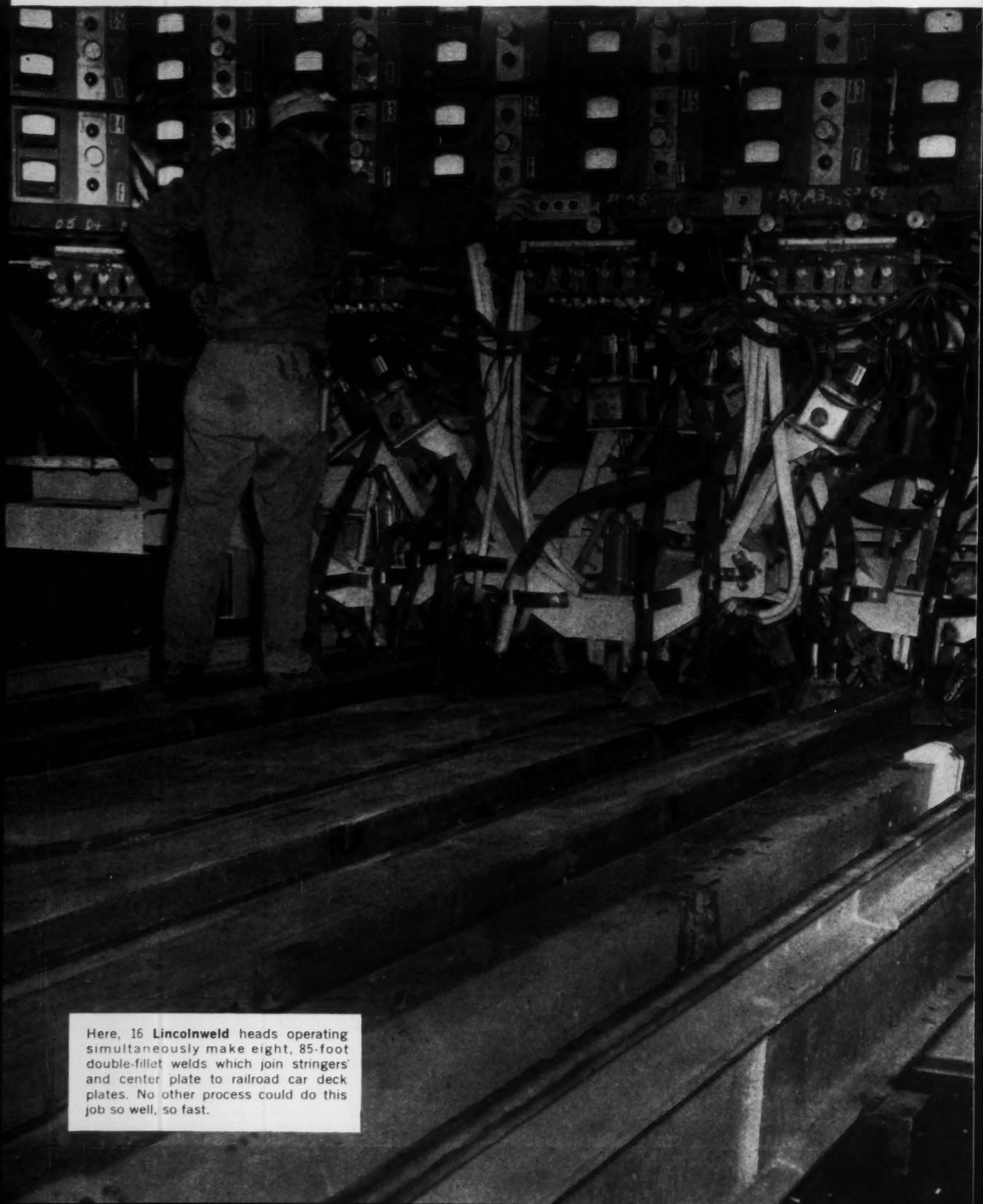
United States Steel

USS

TRADEMARK

You can count on . . .

LINCOLNWELD SUBMERGED ARC WELDERS . .



Here, 16 **Lincolnweld** heads operating simultaneously make eight, 85-foot double-fillet welds which join stringers and center plate to railroad car deck plates. No other process could do this job so well, so fast.

...FOR PERFECT STARTS EVERY TIME

Photo on the left shows an expensive, fully-automated submerged arc setup with 16 welding heads. Press the button. Can you count on every arc to start perfectly? Every time? This manufacturer can. He chose **Lincolnweld** equipment. Because he knows its welding dependability, ruggedness and easy serviceability will protect his investment and guarantee production by consistently delivering good welds . . . fast . . . at low cost.

Here, single LAF **Lincolnweld** head is used to make large fillet welds on bridge sections at speeds not possible by any other process. Note conveniently-mounted controls which let operator govern process at all times. No involved electronic circuitry to get out of order. Components are easily serviced by shop electricians. Lincoln automatic submerged arc heads are made for AC or DC welding, in shop or in the field; can be used singly or in various combinations to get higher speeds, lower-cost welds.

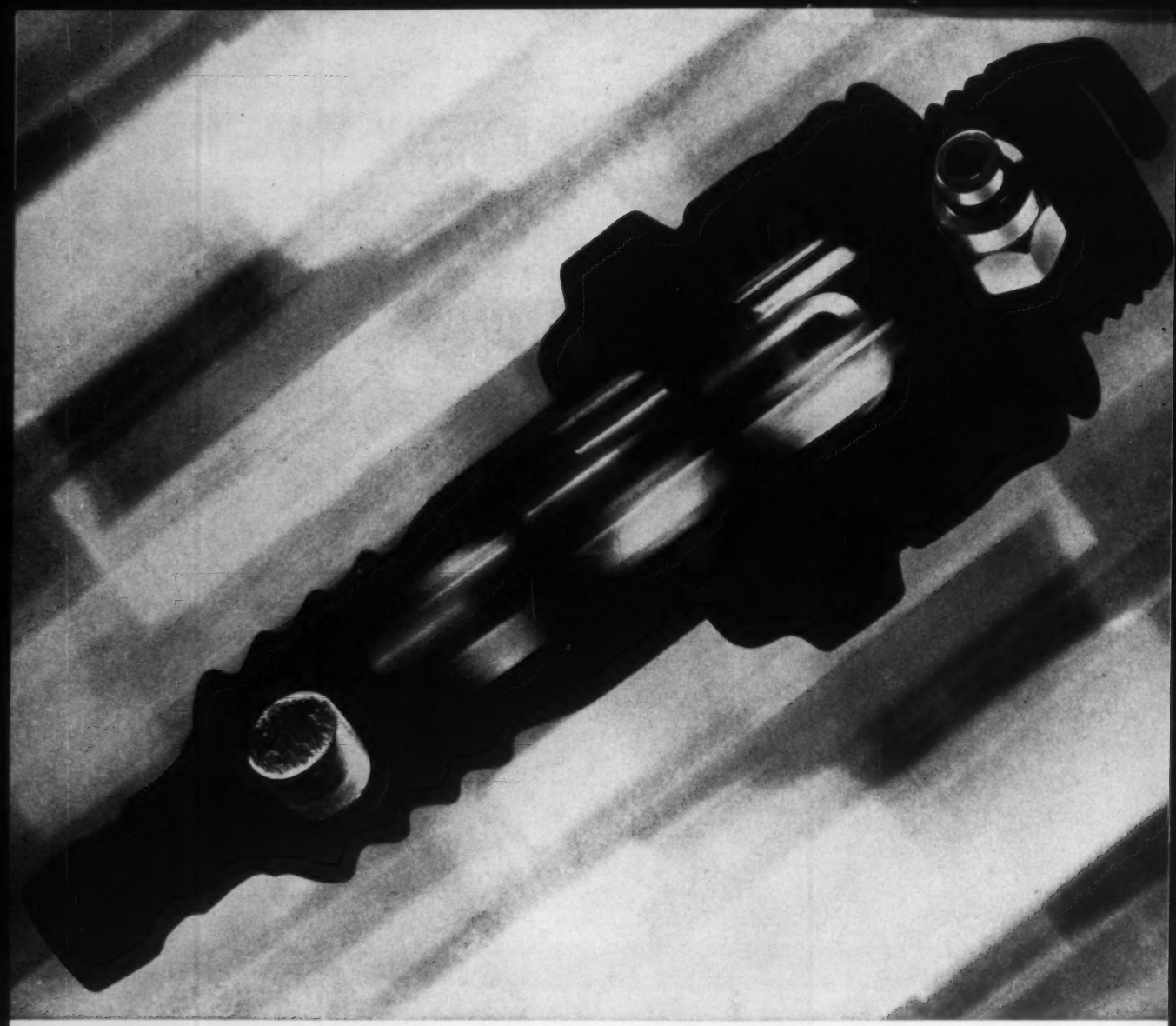
For short production runs, manual **Lincolnweld** gives you the benefits of submerged arc welding . . . continuous wire feed, high speeds and deep penetration . . . without the expense of fixturing. Here, ML-3 gun, propelled at pre-set speed by serrated wheel resting on work, provides a degree of mechanization and control not possible with manual welding.

Parts with unusual configurations were once welded exclusively by stick electrodes. Now, however, you can take advantage of submerged arc welding even on these kinds of joints with the ML-3 or the ML-2 shown here because of their inherent versatility. Result? Higher speeds, lower costs, better quality . . . at low initial capital outlays. See **Lincolnweld** submerged arc equipment in action. Contact your local Lincoln field engineer, a specialist in welding. Or, write for information on this equipment now.

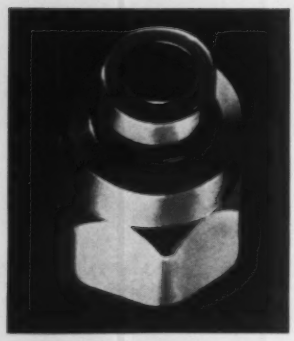
THE LINCOLN ELECTRIC COMPANY • DEPT. 1951 • CLEVELAND 17, OHIO

LINCOLN WELDERS

THE WORLD'S LARGEST MANUFACTURER OF ARC WELDING EQUIPMENT AND ELECTRODES



Spark Plug Shells: 86% Faster



In a mere five-second sequence, machining requirements are trimmed 95%. Material waste is practically eliminated. Spark plug shells are *extruded* from cold steel.

New on the American scene, this is precision cold extrusion. The rewards are great but the technology can be complex. Read the special report dealing with cold extrusion on the opposite page.

Republic Steel is the nation's largest supplier of carbon and alloy steels for precision cold extrusion—hot rolled, cold finished, and wire. More cold extrusion experience promises to save you time and money.

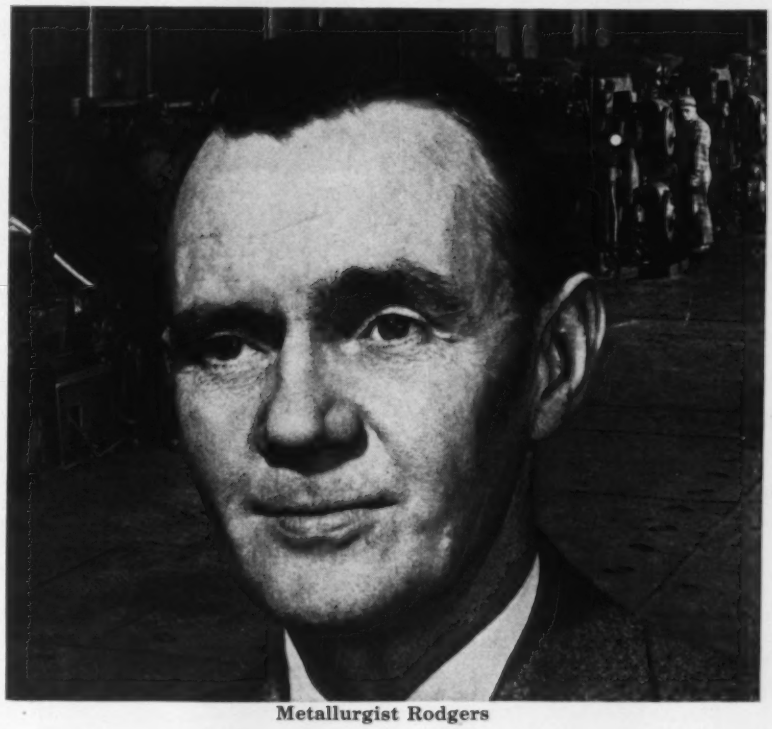
May we serve you? For complete information, contact your nearest Republic sales office or write: *Republic Steel Corporation, Dept. IA-2210-A, 1441 Republic Building, Cleveland 1, Ohio.*

STRONG
MODERN
DEPENDABLE

REPUBLIC HAS THE FEEL FOR MODERN STEEL

Trial, Error, and 30% Savings

Precision cold extrusion is slashing steel waste, producing steel parts faster, but you need more than steel



Metallurgist Rodgers

Chief Metallurgist Bill Rodgers (right), Republic Steel Corporation, helps people produce three steel parts for the price of two. It's being done, by a growing number of Republic customers, and a process called cold extrusion.

With one of the largest field metallurgical staffs in the industry, Rodgers and Republic are helping customers make the cold extrusion process work. It isn't easy. You need a feasible part design, adequate production run, the right steel, extrusion dies that can deform cold steel without destroying it, and proper lubrication to assure uniform movement. Despite progress, trial-and-error is the rule rather than the exception in determining final die designs and material specifications.

Impact of cold extrusion—"Whether or not the public hears of cold extrusion, they're going to feel it," says Rodgers. "Here is a process that can cut the cost of steel parts by 30-50%. It's especially suited to big production runs—parts produced in the tens or hundreds of thousands. Potential savings are fantastic."

The nation's largest supplier of steels for precision cold extrusion, Republic is involved in two out of every four parts produced by this new method. This experience is utilized to its full advantage by customers. As for steel, Republic has built new facilities (the $20 million Chicago 11" bar mill, for example), and modernized existing facilities such as the Canton 8" mill, to supply the products needed.

The process—According to Rodgers, extrusion dies are designed to confine and direct the deformation of steel under severe pressure. Completed or nearly completed parts are produced in one operation. Machining requirements are always reduced, often eliminated.

Five great economies—

. . . Faster production. Steel can be extruded or deformed faster than it can be cut or milled.

. . . Less handling. Steel for cold extrusion normally enters production equipment in the form of coils and bars, leaves as a finished or nearly finished part.

. . . Less material waste. One spark plug shell manufacturer has reduced steel waste by 95%.

. . . Less machining. The cold extrusion process reduces or eliminates machining. Tolerances and surfaces are excellent.

. . . Stronger parts. Cold extrusion assures more uniform flow lines of the grains. As the process is a form of cold work, physical properties of the steel are increased.

What kind of steel—"Primary requirement is that steel be properly conditioned and in suitable tempers," says Rodgers. "Chemistries depend on the physical requirements of the completed part and on the capabilities of the cold extrusion equipment. We work with the customer and his equipment supplier in determining the best steel, proper thermal treatment, and design considerations."

According to Rodgers, proper annealing is especially important in cold extrusion. Annealing increases the malleability, uniformity, and internal quality of steel. Because of this, Republic has installed new atmosphere controlled, continuous annealing furnaces in the Chicago 11" bar mill. Hot rolled, cold finished, or wire drawn steels are supplied in coils, cut lengths, and occasionally in blanks."

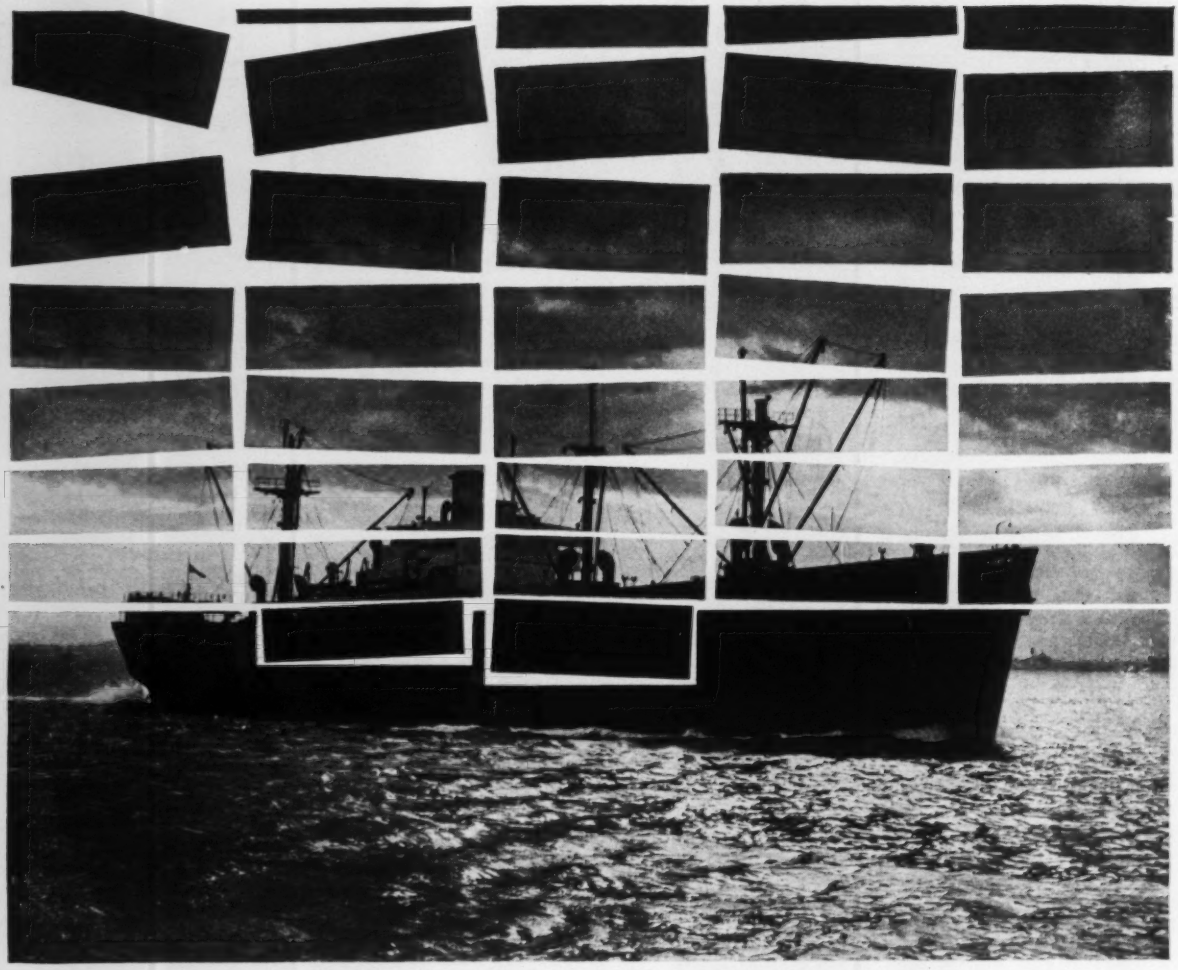
Role of tool and design engineers—

—Parts are normally redesigned to suit or simplify the cold extrusion process. It is the tool and die engineers or the design engineers, according to Rodgers, who most often spot the potential application. With the help of equipment manufacturers and the steel supplier, these men determine precise section changes, required extrusions, and suitable steel chemistries. It remains for the tool and die engineer to design and produce the most important ingredient of all—the cold extrusion dies.

More than steel—"We can supply steel for cold extrusion from any of our bar mills, and from our Union Drawn or wire mills," says Rodgers. "More than that, we offer the technical assistance. Republic is supplying steel used in the cold extrusion of spark plug shells, piston pins, gears, shafts, universal yokes, valve lifters and caps, pivot nuts, missile components, military gun barrels, and many other parts. We do our best to save the customer time and money."

REPUBLIC STEEL

GENERAL OFFICES • CLEVELAND 1, OHIO



For New York Shipbuilding Corporation,

CORO-GARD® 1706 STOPS PICKLING TANK LEAKS, PUTS PROTECTION ANSWERS IN PLACE!

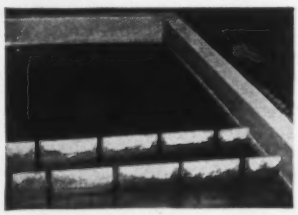
BRAND COATING

New York Shipbuilding Corporation, Camden, N.J., formerly had to repair pickling tank leaks every 4 to 6 weeks. A 15% sulphuric acid solution penetrated the coating then used—caused tank corrosion and leaks. Now, all exposed tank surfaces are protected by CORO-GARD 1706 Brand Coating, and *no leaks have occurred during more than a year's constant contact with the acid solution!*

CORO-GARD 1706 Coating also withstands such corrosive fluids as hydrochloric acid solutions, distilled and salt water, and alkalies, even at continuous heat up to 120°F. It resists attacks by weather, ozone, oxygen and many industrial atmospheres—wards off erosive attack by abrasive-laden liquids. CORO-GARD 1706 Coating is easily applied by brush to unprimed steel, aluminum, copper, galvanized steel, concrete, wood and some plastics. It air-cures to a tough, rubbery protective film.

What can CORO-GARD 1706 protect for you? Call the nearby 3M Field Engineer for technical assistance and information. He can also provide detailed data about hundreds of other 3M adhesive, coating and sealer formulations created to solve specialized problems in protection and fastening. Or write AC&S Division, 3M Co., Dept. SBQ-91, St. Paul 6, Minn.

"CORO-GARD" is a reg. TM of 3M Co.



Pickling tank protected with CORO-GARD 1706 Coating experienced no corrosion, no leaks after more than a year's exposure to 15% solution of sulphuric acid.

ADHESIVES, COATINGS AND SEALERS DIVISION

MINNESOTA MINING AND MANUFACTURING COMPANY

...WHERE RESEARCH IS THE KEY TO TOMORROW

3M COMPANY

... Results of a Superior Beginning

The countless parts and products made from Roebling high-carbon steel spring wire and flat spring steel have one thing in common . . . their superior quality. This, of course, is related to the inherent fineness of the materials.

The variety in which Roebling offers these spring materials is equally impressive. They are available in hard drawn, hard rolled, annealed or soft, tempered or untempered. Types include zigzag and no-sag wires; upholstery and mechanical spring wires; valve spring wire; clock- and motor-type spring steels and flat spring steels of all types and description.

Whatever the type, size or characteristics you require — Roebling can fit your needs exactly. You'll find that Roebling quality means maximum production from your machines and consistent uniformity in your product.

For spring wire and flat spring steel information, contact Roebling's, Wire and Cold Rolled Steel Products Division, Trenton 2, New Jersey.

ROEBLING

Branch Offices in Principal Cities

John A. Roebling's Sons Division • The Colorado Fuel and Iron Corporation

Roebling... Your Product is Better for it

Free your roll shops for redressing and leave the finishing to us

Is roll finishing straining the profitability of your roll shop operations? Many roll users have lowered operating costs by ordering finished rolls from National, leaving their shop facilities for redressing. They've found National's modern, fully equipped roll shop economically meets all requirements for precision finishing of plain or grooved rolls. They know experienced men such as sales representatives John Patton and Bill Mason, pictured above, shoulder the responsibility for roll quality from "spec" to finishing. On your next order for steel, iron or nodular iron rolls order them finished by National. You'll see why . . . NATIONAL'S THE GROWING NAME IN ROLLS.

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GENERAL STEEL INDUSTRIES, INC., Avonmore, Pennsylvania
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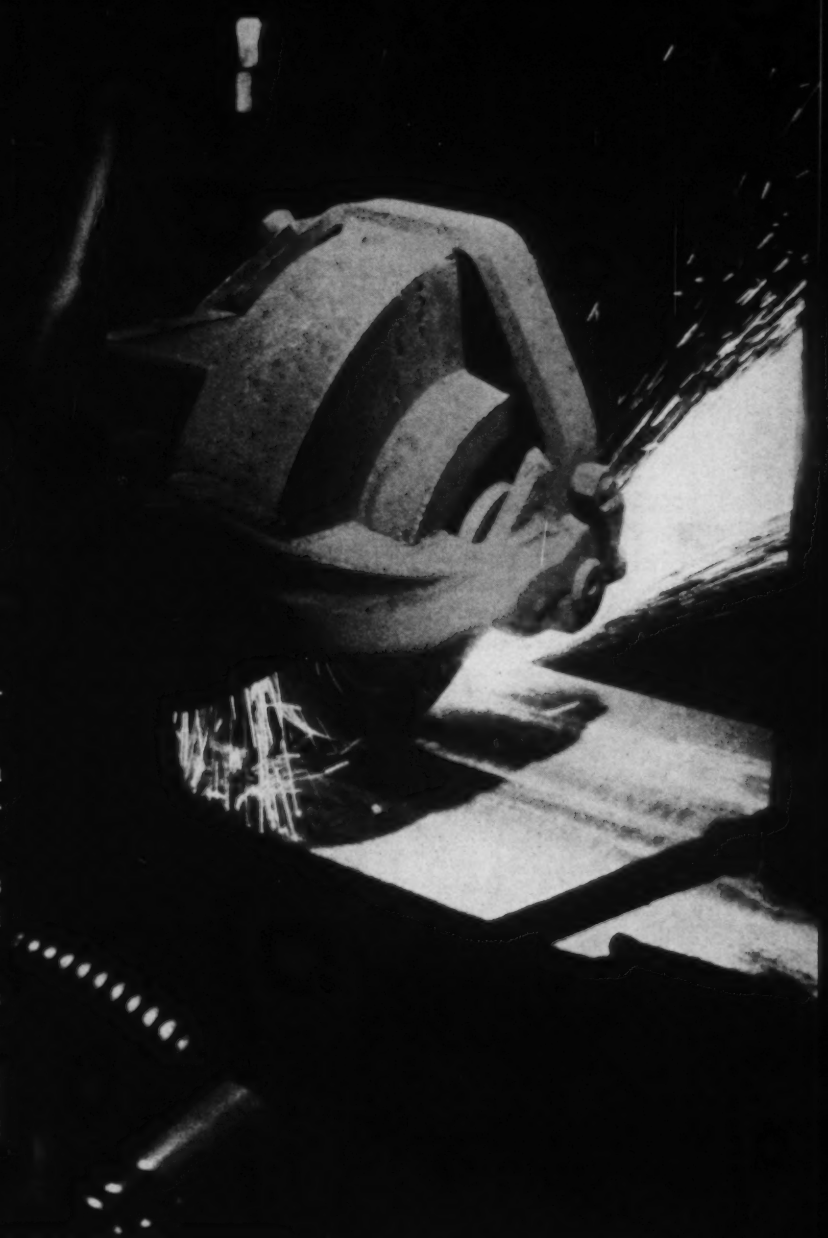
NEW DEVELOPMENT IN

RESINOID WHEELS for BILLET GRINDING



CUT COSTS UP TO 30%

- Especially developed for stainless and special alloy steels.
- Combine new high-strength grain with new bonding technique for dependable results.
- Operate at high head pressures on conventional mechanical grinders.
- Outperform and outlast wheels now in general use.
- Reduce overall grinding costs.
- Performance-proved in leading steel mills.

To arrange a call by a Carborundum sales representative or field engineer write,
BONDED ABRASIVES DIVISION • NIAGARA FALLS, NEW YORK

CARBORUNDUM

METALGRAMS

. . . news of "Electromet" ferroalloys and metals

UNION CARBIDE METALS

SEPTEMBER 1961

CHARACTERIZATION OF FERROALLOYS -- To provide more complete information to steelmakers, UCM recently published data on the occurrence of hydrogen and non-metallic inclusions in alloy additives. Laboratory and field studies made over a period of many years demonstrate that these raw materials, which are used to control the composition of steel, exert a negligible influence, if any, on the gas content and inclusions present in steel. For details, write for the article, "Alloy Quality Versus Steel Quality," in the Summer 1961 issue of UNION CARBIDE METALS REVIEW.

* * *

TUNGSTEN -- HELPS ALLOYS RESIST HEAT -- Because of tungsten, high-speed steel and non-ferrous tools have cutting edges that stay hard under extreme friction and high temperatures. Hot-work tool steels punch, shear, or form metals at high temperatures without softening. Iron- and cobalt-base turbine blades, afterburners, and tailpipes resist erosion and heat from fast-moving hot gases. Union Carbide Metals supplies ferrotungsten, self-reducing tungsten, scheelite, and tungsten metal powder for such additions. Your UCM representative can give you further information. Also, ask for the article, "The Elements That Surround Us: Tungsten," in the Winter 1960 issue of UNION CARBIDE METALS REVIEW.

* * *

MANGANESE IN ALUMINUM -- In binary alloys, manganese improves the strength of aluminum by 20 per cent with no sacrifice in corrosion resistance. Thus, 3000 series alloys (containing 1.25 per cent manganese) are good general-purpose alloys for storage tanks, piping, furniture, TV antennas, awnings and siding, and chemical equipment. Manganese is also added to 2000, 5000, and 6000 series alloys to improve corrosion resistance. UCM offers low-iron ferromanganese and "Elmang" electrolytic manganese for such additions. More information can be obtained by writing for the article, "Manganese Puts Muscle in Aluminum," in the Winter 1961 issue of UNION CARBIDE METALS REVIEW.

* * *

SALUTE TO STEEL FOUNDRIES -- In 1861, the first steel castings made in the United States were poured in Buffalo, N. Y. They were railroad castings, still an important use of steel castings today. This year, steel foundries observe their first 100 years of serving the railroad, earth-moving and construction equipment, rolling mill, mining equipment, military, oil and gas, automotive, and other industries. Some 275 foundries in the U. S. and Canada can pour about 2 1/2 million tons per year for these uses. Union Carbide Metals wishes the steel foundry industry continued growth and success and looks forward to serving its ferroalloy needs in the future. Your UCM representative is always at your service.

* * *

UNION CARBIDE METALS COMPANY, Division of Union Carbide Corporation, 270 Park Avenue, New York 17, N. Y. In Canada: Union Carbide Canada Ltd., Toronto.

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CONTINUING GAINS IN STEEL PRICES at other than mill level persist in the Midwest. Besides a tightening in prices at the distributor level, recent rebar bids advanced in one case by 8 pct. This order was small, but was marked by price gains by firms that had been most competitive in previous bids.

HOME LAUNDRY EQUIPMENT, which hasn't been making too strong a showing on sales so far this year, may be taking off. After lagging behind last year's totals, strong spurts in sales in August have been noted by two producers. They agree sales are well ahead of the same period a year ago, in one case near a record.

IT'S TOO EARLY TO CALL the 1961 score on farm equipment sales, but one source is already betting that total 1961 farm equipment sales will exceed 1960 by over 30 pct. This report, however, is the strongest yet made for the 1961 sales picture.

AUTOMATIC DATA PROCESSING is getting into the big money range. In announcing its entry into the punched card field, Burroughs Corp. officials estimate the current $1 billion U. S. market for electronic data processing will more than quadruple by 1970. The world EDP market is growing twice as fast as the rest of the business machines industry.

FORECASTERS TAKE ON COMPUTER over October steel shipments. Says the computer at one major mill, October shipments will drop sharply. This is more pessimistic than market analysts see it. But, the computer has been outguessing human forecasters for months. The computer looks only at order patterns, comparing them with those of previous months. However, human analysts were right this spring, when they predicted an April upturn before orders showed any gain.

SHOULD TECHNICAL CONTRIBUTIONS entitle a supplier to higher prices than competitors? Not necessarily, according to a recent conference of purchasing agents. In a Pittsburgh workshop session, buyers said they would protect the position of the outstanding supplier in their programs. None said, however, he was willing to pay premium prices to the pioneer of new developments.

PLASTICS RESEARCH should speed ahead, with the establishment of the Plastics Institute of America. Primary aim: Research in all areas of plastics, from basics to fabrication, and full circulation of the information.

A new advance in synthetic coolants

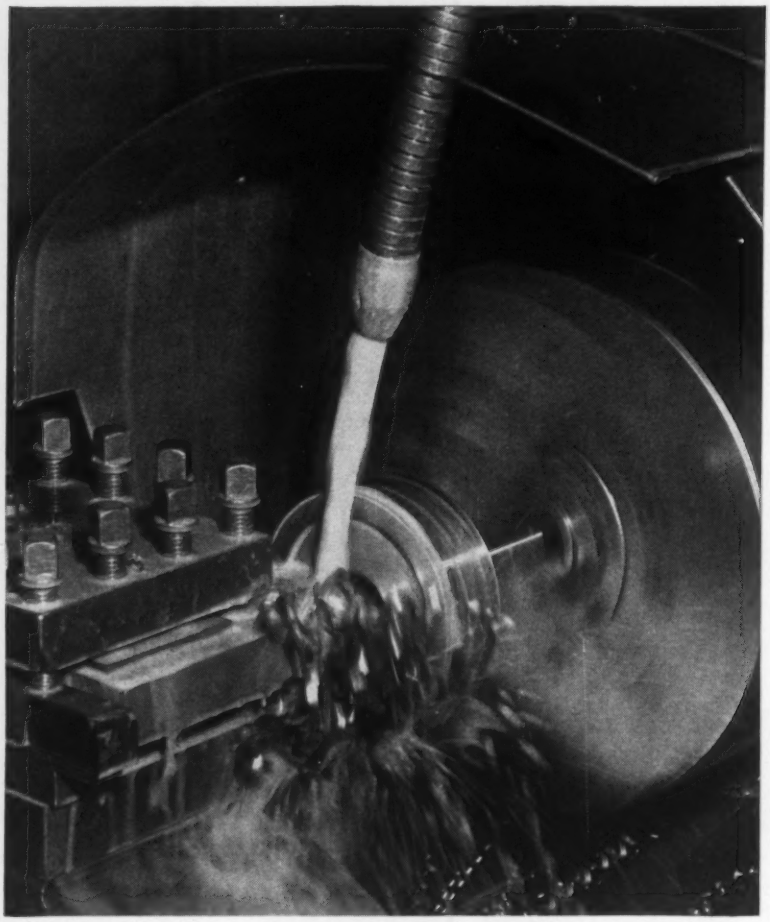
The first chemical coolants were outstanding in controlling rust and rancidity. They have done a good job and are widely accepted for many metal removal operations.

Because they were not heavy-duty fluids, our research department continued its search for a chemically-conceived coolant that could take the place of highly fortified straight oils. The result is new Hocut 3210—a significant advancement in the science of machining coolants.

Hocut 3210 is a highly fortified water-soluble concentrate. It has outstanding anti-weld and extreme pressure characteristics. As a result, it does better those jobs previously reserved for fortified straight oils. Hocut 3210 improves finish at higher speeds without sacrificing tool life. Additionally, it eliminates smoke, oil fog and inherent fire hazards.

Hocut 3210's E.P. characteristics are released by the heat of the cutting operation. This forms a barrier between the tool and the work resulting in a clean cut, free from any welding of chip to tool. Tool life is increased, surface finish improved and parts come off the machine cool enough to handle.

Its heavy duty ability makes it an ideal coolant for tough jobs such as tapping, broaching, form grinding, internal and external thread cutting, thread rolling, plunge grinding, etc.



In spite of all the outstanding features and capabilities of Hocut 3210, its cost is most reasonable. To be up to date on this latest coolant advance, write for complete data or ask your nearby Houghton Man for a test in one of your tough jobs. E. F. Houghton & Co., 303 W. Lehigh Ave., Philadelphia 33, Pa.

Houghton

INDUSTRY'S PARTNER IN PRODUCTION

Dodge Div. Photo

What Do Buyers Really Want? Automakers Hunt the Answer

Automakers admit that they are as confused as the customers when it comes to knowing what is wanted in the way of cars.

Result: A wider range of sizes and shapes than ever before. Where will it end?

By A. E. Fleming

■ This autumn the auto industry will offer the most bewildering assortment of new cars ever set before the American public.

There will be over 400 different 1962 models, a greater variety than ever before and some 50 more than in 1961.

Moreover, the crowd of cars will soon multiply as Volkswagen-size models start rolling off of U. S. assembly lines.

Where and when will this superabundance of sizes and shapes end? Automotive executives themselves are not sure. But from the present tangle of products they hope will eventually evolve a new, mature approach to auto engineering, manufacturing and marketing.

Sifting Attitudes—Typical of today's pressure-ridden auto leaders is S. E. Knudsen, general manager of General Motors Corp.'s Pontiac division.

"The auto industry is moving through a tryout phase," he says. "Call it changing times if you will. There are more cars around than ever. But it's not a matter of offering a batch of cars to the public with hopes they'll grab up as many as possible. We're sifting consumer attitudes to discover once and for all the kind of transportation modern car buyers really do and do not want."

Taste Buds—No one knows better than the automakers that determining public taste is no easy problem. Edsel and De Soto are the most recent casualties of changing public whim. Possibly other nameplates may fade away.

As Mr. Knudsen sees it, "It will be another year to 18 months for the market to straighten out. By then we'll know what the public is looking for, and we'll provide for the needs through manufacturing and marketing means that are in the development stages."

Cause of Confusion—The present auto confusion has emerged

partly because the medium price market was squeezed in the 1950's by "luxury" series of Chevrolet, Ford and Plymouth. In countermoves, the medium brands brought out models at both ends of the market. Price overlapping developed. And the trend toward increased varieties of cars began.

It became a scramble when Big Three manufacturers began developing compacts after the success of imports and American Motors' Rambler.

End of an Era—P. C. Ackerman, vice president of engineering, Chrysler Corp., points out the industry is much different from what it was only three years ago. "Year 1958 marked the end of the postwar era which was characterized by public demand for new styling, larger size, more horsepower, automatic features and power assists.

"In 1960 new demand resulted in the introduction of four different versions of small cars," he says. "The public's idea of what a small car should be was so subject to different interpretations that four additional new cars were brought out in 1961.

"So for the past two years, automakers have been testing the market on a scale never before attempted. This search by each company for the right formula to win public favor may have resulted in some confusion, especially for the car buyer in the economy sector for the market.

"As the 1962 models are introduced, you'll see still more nameplates in the popular price market."

Old-New Standard—In evidence of this, Chevrolet, Ford and Mercury are coming out with "senior compacts" which fit between their regular compacts and standard models.

Observes Mr. Knudsen: "It remains to be seen whether the new super compacts will affect the market. It'll be intriguing to see if they take sales away from the historical low price cars. Personally, I think they will."

This observation points up the role these super compacts will play this year in testing consumer attitudes. If they are a success, the "standard" form of transportation will have returned to the sizes of the late 1940's and 1950's.

Four Car Family? — Whatever happens, one thing seems certain: The day of the all-purpose car, the family vehicle, is nearing an end.

The industry is pushing the theory that people want cars designed for specific needs; that the day every family will need three or four cars is not far off.

Points out Dodge general manager B. J. Nichols, "The average American is now insisting on cars which are custom-tailored to his own personal driving patterns. Styling is important but preference is for functional design. Luxurious interiors are valued only if they're easy to maintain. Gasoline economy is important but not at the cost of good performance and cruiseability.

"American families are aspiring to own a stable of automobiles, made up of cars that meet the needs of each individual member of the household."

Product, Not Price — Pontiac's Mr. Knudsen agrees. He says the car business will be strong in 1962. He predicts, 7.25 million new cars will be sold including 400,000 imports.

More than ever before the customer must be sold the exact piece of transportation he needs, he says. "This is going to have to be a year of product and not price selling. Value and features of the car must be stressed."

Quick to Change—With all the variety of engineering features the industry now offers, emphasis is being placed on manufacturing flexibility. As an example, auto plants, among them Pontiac, are set up to assemble both unitized and body-frame cars on the same line.

Another example: Pontiac sliced its V-8 engine in half a year ago to come up with a four-cylinder en-

PONTIAC'S KNUDSEN: "The auto industry is going through a tryout phase. Call it changing times. . . . We're sifting consumer attitudes."

gine for the Tempest. Buick's new V-6 will use many of the parts of the Special V-8 engine. About the only difference between Chevrolet's new inline six and four is two cylinders.

"You've got to stay flexible and roll with the punches," says Mr. Knudsen. "Operations have to be simplified so you can move quickly as trends develop. Changes are never ending these days."

Watching the Calories — Whatever does come along that is new, odds are it will fit into the basic aim of manufacturers to reduce the weight of the car and the engine. Smaller, lighter cars take less material. This means lower costs.

An example of this trend is the competitive struggle between aluminum and cast iron as engine block material. No aluminum engines came out on 1962 models. But several cast iron engines were introduced. This indicates that production costs with aluminum have yet to be solved.

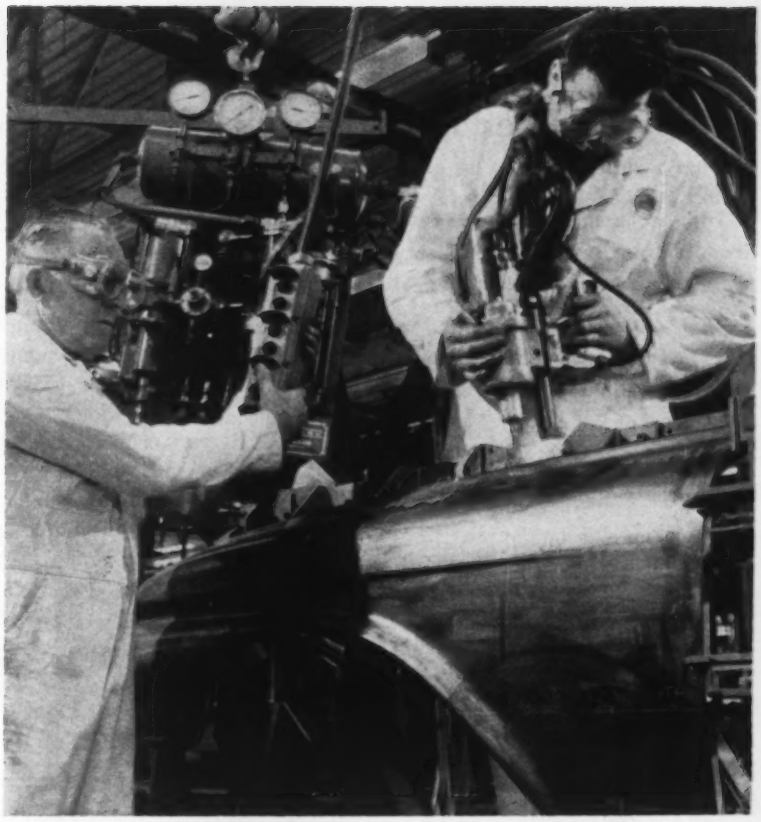
Behind by a Head — Estimates are it will take at least one more year to evaluate the manufacturing costs and technique of aluminum engines. Another drawback: An aluminum head has yet to be developed. Up to now there has been no solid evidence that this can be done. However, it might not be far away.

In the long run, aluminum still has a great deal going for it as an engine block material since weight savings mean improvement in economy.

So in the coming year, auto makers will closely check the manufacturing cost of aluminum engines. Production cost is the only thing bothering the industry now.

Thin Wall of Iron—Higher production of cars in 1962 means output of aluminum engines should go up, too. American Motors will build more aluminum Sixes. So, probably, will Chrysler.

On the other hand, Buick's cast iron V-6 in the Special might be classed a setback for aluminum. But it does give Buick a lower price-tag. It needs this to attain high volume in the compact field.



WORKING AHEAD: Prototypes of next year's cars are already being made by hand by skilled workmen such as these at Ford Motor Co.

Auto companies are investigating the V-shape aluminum engine. American Motors is intrigued by this design as it allows a shorter car.

The newest trend in engines this year is to the thin wall cast iron block. It evolved through new foundry techniques which reduce wall thicknesses and weight.

It's Supercharged — Horsepower will go up in 1962. All groups, big and small cars alike, will see some power boosts. Here, the Oldsmobile F-85 turbocharger is meaningful. The turbocharger won't be accepted by the entire industry. But it will be hailed by the hotrod element.

In transmissions, an interesting development this year is Rambler's E-stick. Actually this is more an automatic clutch than an automatic transmission. It ties-in with an effort to simplify the automatic transmission. And it is a low cost approach to simplified driving.

Also in the transmission area, apparently plans have been shelved to develop a rear transmission for big cars. Lighter engines have done away with the necessity of reducing weight in the front end of the car by moving the transmission to the rear end.

A New Leaf — The single leaf spring on the Chevy II is the most significant development in suspensions. Some manufacturers have been experimenting with this for a decade. Other GM divisions will put the single leaf spring on their compacts—if it goes over at Chevrolet. Ford Motor Co. also is working on a similar spring.

The biggest item in the chassis area is the elimination of lubrication for many cars. This has been done on big cars but not smaller ones. The trend should continue.

1962: Forecasters Take a Look

And They Predict Substantial Gains in the Economy

Top economic forecasters from a cross section of industry went out on the limb last week.

They expect most sections of the economy to show strong gains through next year.
By T. M. Rohan

■ The speeches all sound alike with only the numbers changed, commented a speaker before the Cleveland chapter of the American Management Assn. last week.

But it's not surprising. Top economic forecasters from industry were taking a look at the year ahead. And what they saw was good.

Big Year for Autos—Auto builders are looking forward to a monumental fourth quarter this year if predictions by Ford Motor Co.'s Robert J. Eggert are to come true. He said so far in 1961 deliveries have been at a 5.6 million annual car rate; but a strong fourth quarter will raise this to 5.9 million.

Next year's 15 pct increase, to 6.8 million, is based on more federal spending, easy financing, more plant construction and housing starts and decreased car imports. He predicted a 10 pct rise in GNP to $560 billion.

Construction Is Strong — Construction outlook is so good that the Dept. of Commerce finds it hard to believe.

"It looks so good that we in the department who are faced with the problem of preparing next year's official outlook are somewhat uneasy," says Benjamin D. Kaplan. "The one-sided picture is somewhat inconsistent with historical movements in this important sector of the economy."

Mr. Kaplan feels that outlays in construction next year, for all 40 major categories, will be close to $60 billion or 4 pct over this year. This will include $41 billion private outlays and $18 billion public.

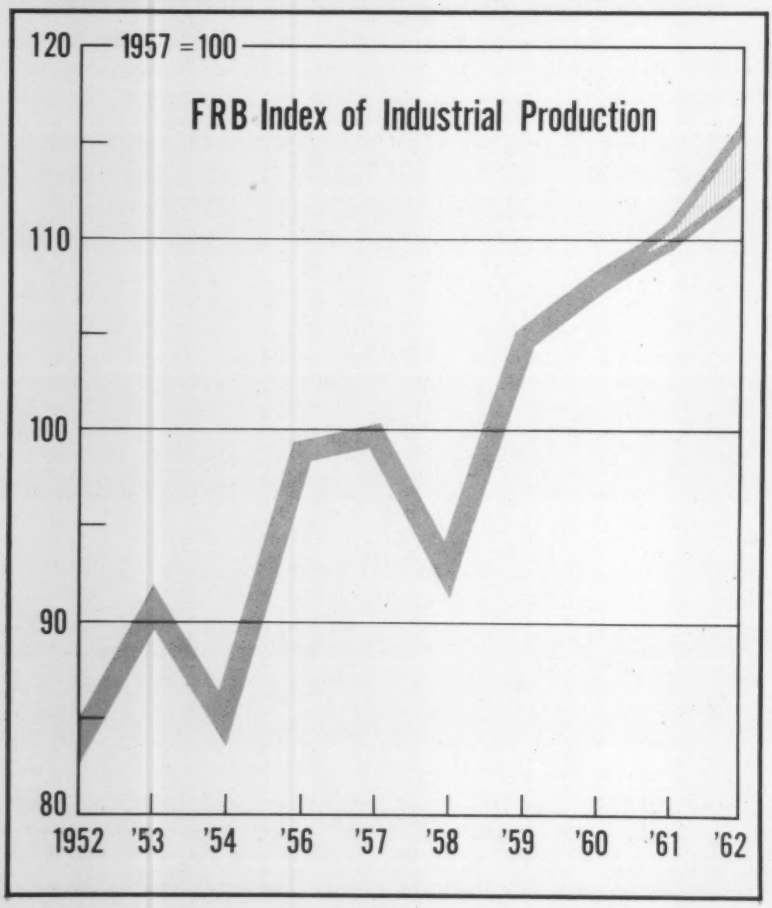
For 1975 he sees it over $100 billion in 1960 dollars. For next year he sees all-time highs in public construction, including highways but excepting hospitals. In private, nonfarm building he sees an increase of 75,000 to 100,000 next year over this year's 1.3 million starts.

Industrial Output—A 3 pct to 5 pct betterment of industrial production in the U. S. next year is the view of the Federal Reserve Board's Merle Hostetler. But he feels the GNP will not go from the $525 billion annual rate of the third quarter this year to $600 billion.

"Right now the U. S. should be running an $8 billion to $10 billion surplus because of the high level of business instead of a deficit," he concluded amid cheers from the group.

Steel Reacts — William Carlin, Republic Steel Corp., looks for steel output to reach 110-115 million tons next year, up from 100 million tons this year.

Production: Climbing Higher



Mr. Carlin said that next year steel users suddenly will recall the 1959 contract negotiations and steel strike and "all the electronic inventory calculations will go out the window and orders go out to buy to infinity."

He estimated steel consumption now is about 1.8 to 1.9 million tons per week. This is about 5.5 to 6 million tons per month. He says it will increase in the first half next year to the 2 million ton level. Then, in the second half it will level out.

He said that part of the rise in steel production now is from higher in-plant inventories by mills as well as steel users rebuilding inventories. Production is running at about 2 million tons a week, slightly more than consumption. In the fourth quarter this year he expects steel production to climb to 2.2 million tons per week.

Inaccurate? — Mr. Carlin says Bureau of Labor Statistics labor scales are inaccurate. They exclude fringes. Steel tonnage sales figures are inaccurate because they include a variety of other products such as cement, fasteners, and barrels.

Steel earnings, he says, are inadequate and plant and equipment are far above other industries. Capacity of operation estimates, too, are off because "now we have no capacity rating."

"Price increases are only symptoms of what really goes on," Mr. Carlin says. "No one industry can withstand the trend. For the steel industry generally, and Republic in particular, the market place is where prices are determined."

Dishwashers Gain—The outlook for appliances is less optimistic than other forecasts, according to Harvey E. Weimer of Whirlpool Corp. Unemployment has lowered buying power. Unlike the more optimistic auto industry, he points out, there are few two-washer families. And most appliance replacements can be postponed for quite a while by servicing and repair.

However, his outlook is for 16.8 million major appliances next year. This is equal to a 1 million unit gain or about 6 pct. Dishwashers are moving well, he adds, but they are the only new appliance showing promise of becoming a major one.

Services Grow—Bulging services expenditures show how rapidly the U. S. is becoming a coddled nation. But there are a few vindications. Albert T. Sommers of the NICB said that services are now $140 billion per year. Services account for 40 pct of total personal expenditure and about a quarter of national output. They are also growing at 7 pct per year.

Mr. Sommers expects the prices will continue to go up more rapidly than durable goods and commodities. In goods, he pointed out, inventories can be liquidated at lower prices but in services, prices are "very sticky" and committed at high levels for long periods, such as in rental prices.

Priming the Pump—Oil well drilling will probably continue next year at about this year's 47,000 pace, Gulf Oil Co.'s E. F. Eisemann feels. But they are getting shallower. He predicted an FRB index next year 119. For gasoline, no significant price changes are expected. But "private brand" discounting is starting and causing more price wars. He feels half the cars sold will be small size by 1963. While compacts use less gas, this is offset by more two-car and three-car families.

Chemical Reaction — Chemical business generally has come back about 13 pct from its 1960 low, according to Dr. Lewis E. Lloyd of Dow Chemical Co. But the plastics part of the business is suffering from prices depressed about 4 pct to 5 pct by "new companies trying to buy their way into the business."

He adds that magnesium use is starting to come back to 1958 levels. It dipped sharply then because of the switch from airplanes to missiles, loss of market as reducing agent for titanium and parallel drop-off with aluminum.

A Look at the Year Ahead

In Cleveland last week top marketing forecasters took a look at the year ahead. Here's what they see for 1962:

Autos—A 6.8 million car year for the auto industry, predicted by Robert J. Eggert, Ford Motor Co.

Construction—Almost a $60 billon construction year, says Benjamin D. Kaplan, Dept. of Commerce.

Steel—A 110 to 115 million ton year for steel, including a big first-half strike-hedge scramble, believes William Carlin, Republic Steel Corp.

Appliances—A 6 pct gain, to 16.8 million units, for major appliances, is the prediction of Harvey E. Weimer, Whirlpool Corp.

Chemicals—Modest increases for chemicals and plastics are expected by Dr. Lewis E. Lloyd, Dow Chemical Co.

Gasoline — Fierce competition will continue in gasoline with "discount house" private brand merchandizing on the rise, says Eugene F. Eisemann, Gulf Oil Co.

Industrial Production — Federal Reserve Industrial Production index will be 110-111 this year, then climb to 113-116 next year, says Merle Hostetler, FRB's Cleveland vice president.

Services—Cost of services will continue to rise to $155 million and 55 pct of U. S. employment, predicts Albert T. Sommers, National Industrial Conference Board.

HIGH-SPEED WELDER: Developed by New Rochelle Thermatool Corp., this welder is type used by Reynolds Metals for high-speed welding of aluminum cans.

READY FOR CUT-OFF: After welding, American Can Co. officials inspect can stock before cut-off. New process can turn out up to 2000 cans a minute.

Canmaking Speed Is Tripled

▪ Canmakers have brought off a major breakthrough — machines capable of tripling the speed of canmaking.

The advance matchs achievements in developing new canmaking materials—aluminum, thin tinplate, and the thin, thin tinplate.

The new canmaking process was made public last week by two companies—American Can Co. and Reynolds Metals Co. And in announcing a new technical center at Plainfield, Ill., Continental Can Co. pointed out it also is "working on a radically new process" of making aluminum cans.

Solved: Two Problems—For the breakthrough canmakers had to solve two problems: The high speed welding of can stock from long coils of metal; and fast cutoff of the welded material into can sizes.

The process announced by Reynolds Metals Co. makes use of a high frequency electronic welding method developed by New Rochelle Thermatool Corp. With it, thin wall tubing, such as that used in manufacturing tin cans, can be produced in excess of 1000 ft a minute, according to New Rochelle.

The company describes the equipment as capable of welding any metal (ferrous or nonferrous) at rates above 250 ft a minute. It has previously been used in the production of pipe and tubing products. (See IA, July 20, p. 100.)

Welding Key Factor — (While neither American Can or Continental Can mentioned the welding process they will use, a spokesman for New Rochelle told IRON AGE both have bought Thermatool welders for experimental use.)

Reynolds has set up a licensing agreement with New Rochelle under which Reynolds will purchase, use, and lease equipment to canmakers.

William G. Reynolds, executive vice president, research and development at Reynolds Metals, said the company is now installing the first machine at one of its packaging research facilities.

American Can, in announcing a "revolutionary new machine that can produce aluminum or tin coated steel cans at speeds more than three times as fast as conventional machines," did not comment on the welding process.

Cut-Off Explained—But American revealed how it solved the cut-off problem with a unit called a "Ferris Wheel."

The canmaking machine forms cans from a continuous ribbon of sheet metal, bending the ribbon into a tube, welding the sides together, and automatically cutting them into cans of the proper size. The cutting is done on the "Ferris Wheel" at the end of the operation.

Big Future for Tungsten Crystals

Westinghouse Development May Lead to Profitable Markets

Tungsten crystals aren't new. Why so much attention to Westinghouse development?

The high-purity crystals are already being sold. They may have a future in space programs. By F. J. Starin

▪ The Lamp Div., Westinghouse Electric Corp. has grown some single crystals of tungsten which it says may be a "major step forward in the tungsten field."

At this point the trade is reserving judgment. Why? Single crystals of tungsten have been grown before.

Dr. R. H. Atkinson, lamp parts chief engineer, a key figure in the development, told The IRON AGE the major difference between the Westinghouse crystals and those grown by others:

"We know other companies have been growing single crystals of tungsten. But those which are as large, as or larger than ours, don't have the high purity. And those which are in our class in purity aren't large enough to be practical commercially."

Ductility Is Key—The Westinghouse tungsten crystal, available commercially for $140 per inch, is 10 inches long and .2 inches in diameter. It has a purity of 99.9975 pct. "Westinghouse has proven that ductility depends on purity," explained C. O. Young, manager of the lamp parts dept. He said that Westinghouse tungsten crystals are ductile even at temperatures as low as −330°F. "Our tungsten crystals can be rolled, drawn and swaged even at low temperatures," adds Dr. Atkinson.

The company reports some of these crystals have been sold. But customers will be making tungsten parts for classified applications under government contract, so no details or examples are available.

First Step—Actually, Westinghouse considers this development only a step on its research road. Mr. Young explains, "High purity crystals are of particular value in studies of fundamental properties of high temperature metals. Such knowledge is vital to the development of space materials.

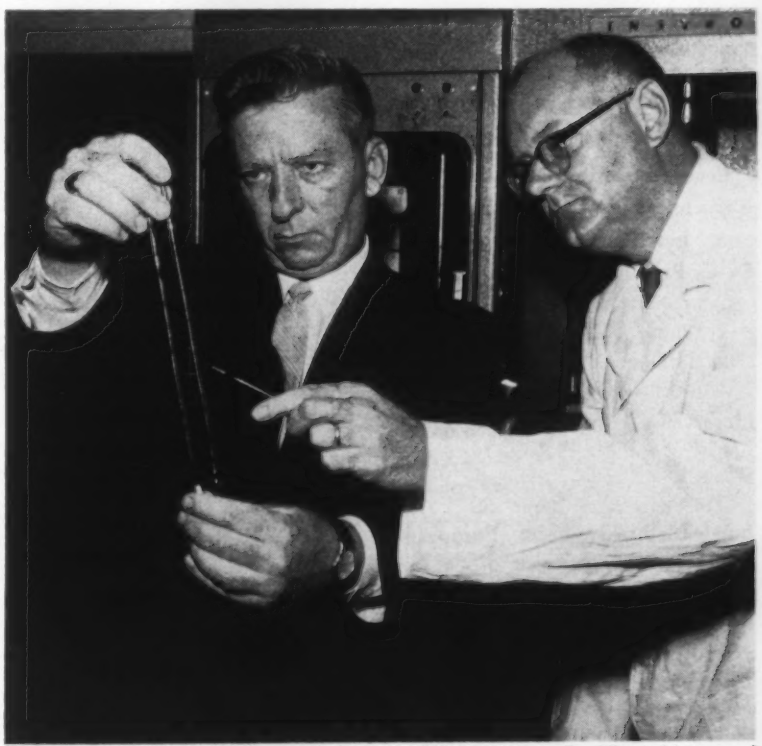
"Tungsten, having the highest melting point and the greatest strength of all the metals, is a promising material for applications such as rocket motors. However, much remains to be discovered about its behavior.

"The availability of superior tungsten single crystals opens the door wide to advance research."

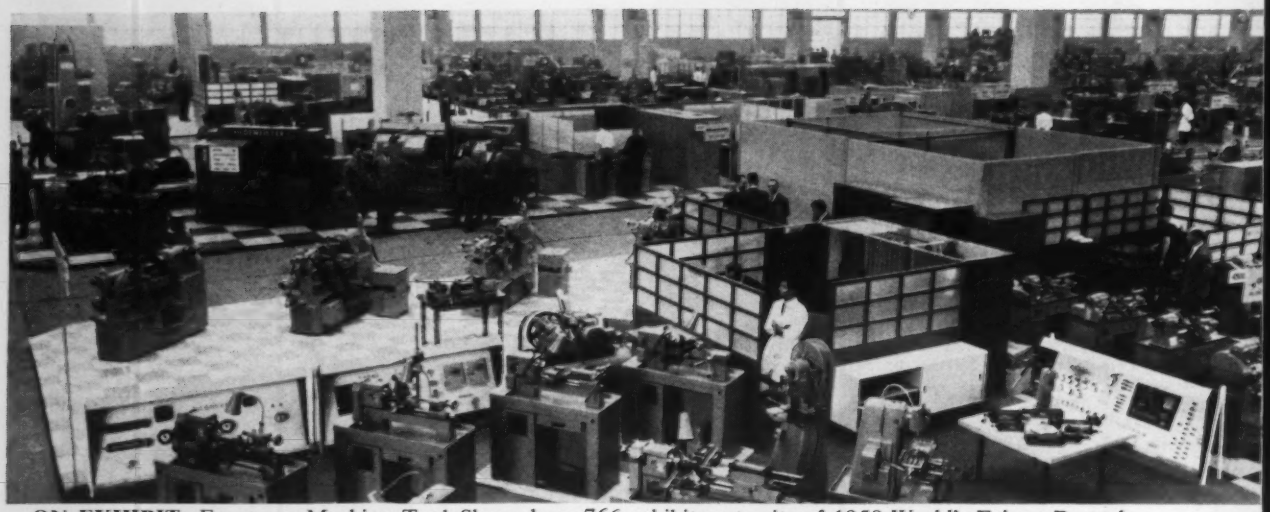
To get these super-pure crystals, Westinghouse engineers first developed a process for making special high-purity tungsten ingots. Then they "designed unique zone melting equipment using the electron beam principle of heating in order to produce bigger and superior crystals."

Linde Active, Too—Linde Div., Union Carbide Corp., is one of the other companies making single crystal tungsten. A Linde spokesman says his company is currently selling single crystal rods of tungsten as long as 1 ft with a 1-inch diameter. And he says the company intends to reach 2 inches diameter.

Price is a problem. "When we brought our single crystal rods out in June 1960 we charged $100 per inch because that sounded like a nice round number." A Linde spokesman says. "Considering our development costs, we lost money. And I believe Westinghouse must be losing money at their current price."



HEADED FOR SPACE: C. O. Young, left, and Dr. R. H. Atkinson of Westinghouse examine single-crystal tungsten rods. Potential is in space.



ON EXHIBIT: European Machine Tool Show drew 766 exhibitors to site of 1958 World's Fair at Brussels.

Report from Germany

U.S. Interests Grow in Europe's Machine Tool Industry

The world markets for machine tools are changing and U. S. builders are adjusting with them.

Brussels exhibition shows new U. S. influence in booming European machine tool industry.
By G. F. Sullivan

■ Nowhere could you find more obvious signs of the changing face of world machine tool markets than at the Seventh European Machine Tool Exhibition this month in Brussels.

The names of some 30 U. S. builders appeared on European-built tools—very much of an all-time high. Even that does not represent all U. S. participation by subsidiaries, joint-ventures or licensees. But it shows the extent to which U. S. companies have moved to get at least some share of markets that have recently been closed to them by sharp differences in labor costs.

More Numerical Controls—This year the exhibition had its first British president, Robert W. Asquith. His opening address echoed the hopes of British builders that the UK would join the Common Market.

On the technical side, while numerical controls were not as numerous as they were at the U. S. 1960 exhibition in Chicago, there were plenty on display in Brussels. Shown by a few German builders last year at Hannover, and generally considered there to be toys of the rich, labor shortages and rising costs are bringing them to the fore in Europe. Most major builders had at least one such unit on machines to which they are applicable.

To Go Metric?—Great Britain will probably enter the Common Market, and may possibly swing over to the metric system. Mr. Asquith, who heads one of Britain's top machine tool companies, is optimistic about the former. "I believe we'll be in the Common Market in 12 to 18 months," he told THE IRON AGE in an exclusive interview.

As to Britain's going metric, he was dubious. "I'll say this: If I were starting a new plant from scratch, it would be all metric."

There has been talk, but so far just that, about Britain's converting to the metric system, Mr. Asquith said. The cost would be staggering, but it would make quite a difference to the British position in the Common Market. Particularly since the British feel that, as far as Europe is concerned, at least,

NEXT WEEK
West Berlin

How metalworking plants are making out under the closing of the East Berlin border will be reported next week from West Berlin.

they have an edge in electrical controls.

To go metric would mean completely redesigning all machines. The English have gone further in switching to the unified thread—a U. S.-British compromise—that the Americans have. Like U. S. builders, they do supply metric dials, etc., now. Complete conversion might affect U. S. sales in world markets, too.

British builders are running at capacity, with a good many automotive orders on the books. Their deliveries are about midway between those of the German and the U. S. builders. Example: 12 months is about par for an automatic lathe. Exports are running a bit ahead of last year.

The Germans have raised prices about 5 pct in the face of a 7 pct boost in wages and a 5 pct upward revaluation of the mark. Exports are off between 5 and 10 pct for the year because deliveries on the larger machines are out to two years and more. Although some 13 million refugees from East Germany, Czechoslovakia, and Poland were absorbed, Germany's labor shortage remains acute. German industry has also imported something like half a million workers from Spain, Holland, Greece, and Italy. Most workers are unwilling to go beyond the standard 44 to 45-hour week, prosperity being what it is there.

Numerical control is on the increase in Germany, according to export salesmanager Ernst Grund of

BRITAIN'S ASQUITH: "In the Common Market in 12-18 months."

Schiess, AG., but it is not a hot item in the export market. He's frank to admit that some of Schiess' export sales have been on price, says that others are based on the machine's features—speaking of turret lathes and gear hobbers.

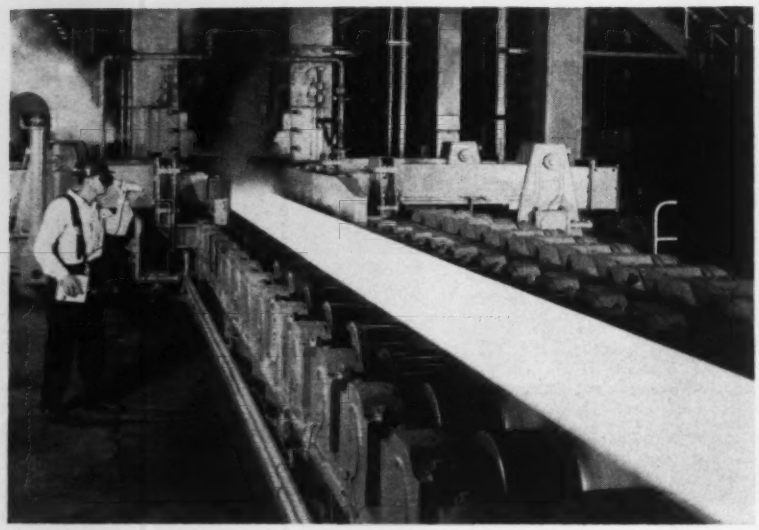
As for France, so many smiles have not been seen since the Yanks liberated Paris in '45. From a slow start, French builders last year exceeded 1959's production by 17 pct; for the first six months of this year orders topped the like 1960 period by 30 pct. They should wind up the year with a shipment gain of 20 pct. And they expect to carry that same figure into the export column. The workweek averages 49 hours for the industry's 16,500 plant workers.

Said Jacques Martin, export manager of AFMO, which represents five French builders, "This has been by far our best year."

Switzerland, second only to Germany in exporting to both the Common Market and Free Trade countries, continues to hum. Exports, which account for about two-thirds of Swiss output, were up slightly last year. The Swiss industry, with some 14,000 plant workers, exported about $82.5 million worth of machine tools last year. Deliveries on smaller machines range up to a year, double for larger tools.

Italy's industry is moving faster than Caesar's army in Gaul. Output this year will probably top 65,000 metric tons, against 30,000 tons in 1958. This begins to crowd France, with an estimated 86,500 metric tons for 1961. But Italian industry sources think they are close to their peak for some years because they've hit the roof on labor. They've had some luck in luring back some of those the Germans and the Swiss lured from them a few years ago. But they feel it will be a good 10 years before they can increase their skilled labor supply.

Deliveries of Italian tools are almost as extended as the Germans' —from 24 to 28 months is par.



At 2400 FPM: Optical pyrometer checks temperature at new hot-strip mill.

New Mill Saves Jobs

■ A super-powered 56-in. continuous hot-strip mill for tougher metals like high alloy as well as regular carbon grades was dedicated by Republic Steel Corp. in Warren, O., last week. Costing $55 million, it replaces a 25-year-old 42-in. mill (at 10 times the cost).

A "new mill for a new era," the unit is unique for two reasons. Because of the high capacity of 90,200 connected horsepower, the mill can also roll metals tougher than carbon steel, namely stainless, high tensile, silicon, titanium, chromium-cobalt steels and other exotic materials. It is the most powerful of its size in the industry with a maximum exit speed of 2400 ft. per min.

Delicate Touch — Additionally, because of a faster-response Wheeler hydraulic automatic screwdown control, it will roll to much closer tolerances than predecessors and some customers have specifically requested their steel be rolled on the new mill for this reason.

Republic's president Thomas F. Patton hailed the mill as a major step in capital investment for modernization.

"With all its power and speed, it rolls its product with a delicate touch," he told an audience of 700 customers.

"We will stack it up against any hot mill in use, under construction or on paper in the industry."

Job Saver — He added that the previous 42-in. mill which "had made its mark in America's industrial history" had seen its day and grown obsolete. Without the new mill, many jobs in Warren were in jeopardy. So the new mill saved jobs for the workers.

"We have already embarked on a joint study with a major producer of electronic equipment to determine the feasibility of tying together all units of automatic equipment—along with scheduling, record-keeping and analysis—into one unified system under computer control." Mr. Patton said.

The new 56-in. mill is the largest of three at Warren and will turn out 140,000 tons per month in coils up to almost 50,000 lbs. with weights of up to 900 lbs. per in. and up to 73 in. dia. Wider strip is rolled at Republic's Cleveland Works on a 98-in. mill, world's widest continuous mill.

Cadillac to Build Armored Vehicles

The Army is awarding two armored vehicle contracts to Cadillac Motor Car Div., General Motors Corp.

The contracts cover Cadillac-developed T114 armored reconnaissance carrier, the T195E1 self-propelled light howitzer, and the T196E1 self - propelled medium howitzer.

Production will be in the Cleveland Ordnance Plant. The vehicles are designed to furnish front-line troops improved tactical capabilities over vehicles being replaced.

Alcoa Design Unit Aids Foil Buyers

Aluminum Co. of America has set up a new package design dept. for its new printed foil division.

Production of printed foil by Alcoa will begin shortly on new facilities being installed by R. R. Donnelley & Sons Co., printing firm in Chicago. Foil products will be printed by Donnelley and sold by Alcoa.

The design dept. will give Alcoa customers "one of the packaging industry's most complete integrated research, development and design services," according to J. R. Roney, manager of printed foil sales.

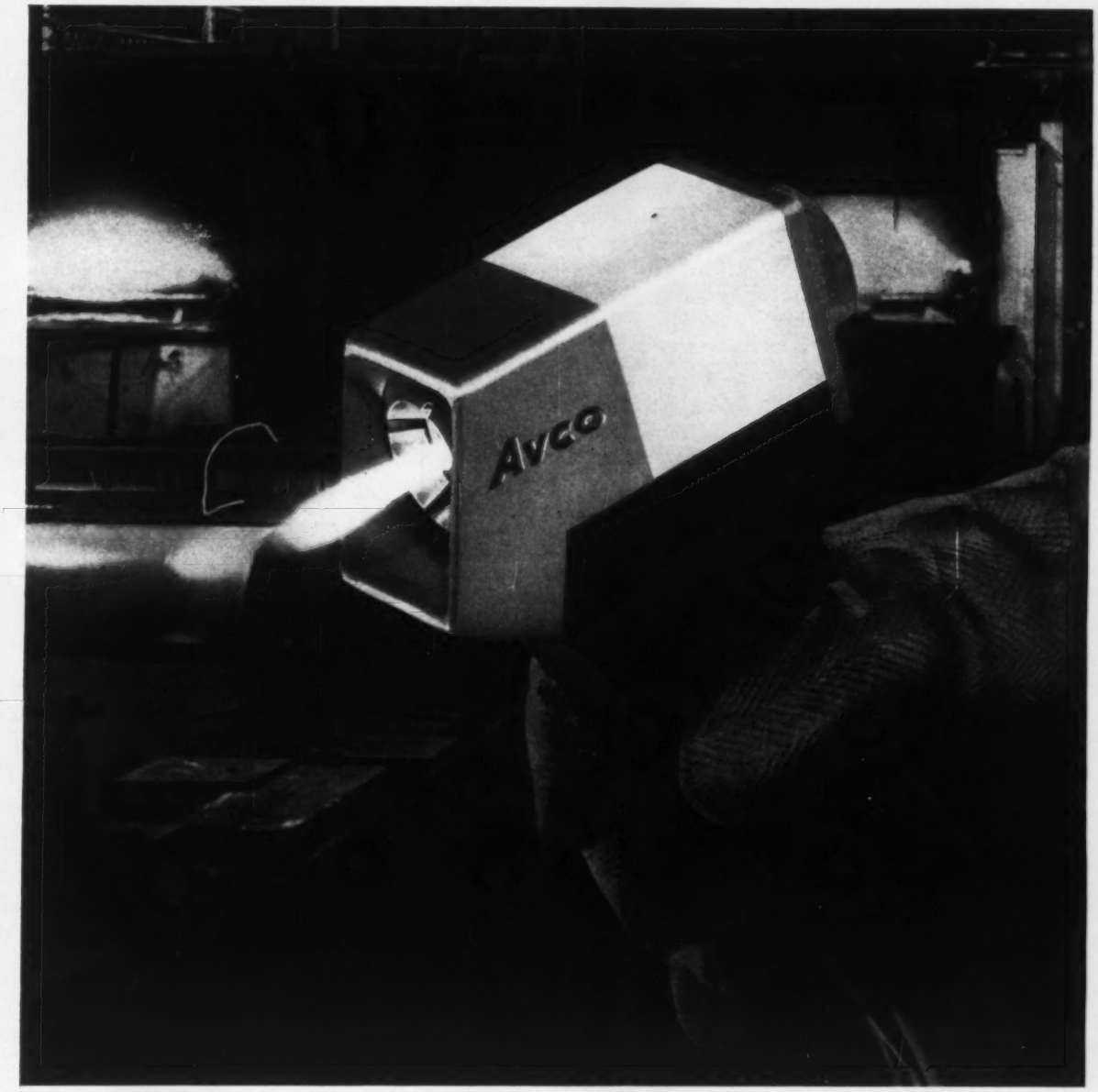
New Pipe System, Expansion Marked

Plant expansion and a new aluminum underground pipeline system have been announced by Reynolds Metals Co.

The Longview, Wash., reduction plant will be expanded. Following a $700,000 addition, Reynolds will install two more holding furnaces and a vertical direct casting machine to produce 5000-lb ingots.

At Richmond, Va., Reynolds has developed an aluminum underground pipeline system for connecting gas mains to home lines.

Fabricated in continuous 300-ft coils, the system eliminates need for intermediate joints.



Avco puts the PlasmaGun to work—in your plant

This Avco PlasmaGun spray-coats metals, ceramics and refractories with a thickness, density and bond strength never before possible—right on your production line.

It sprays uniformly without clots or streamers at roughly half the cost of other plasma equipment. And you can save up to 30% over conventional spray-coating—even more when fabricating free-standing parts from materials such as tungsten.

The Avco PlasmaGun takes powders previously too fine for other plasma equipment. The cathode is adjustable, too, for convenience and economy. (No need to switch cathodes each time you change powders.)

The cost? Lower than you think. It can pay for itself on the first job. Maintenance? Easiest of any gun in the field. (The PlasmaGun assembles with only 4 bolts!) Warranties? On all parts, for six months. (Another exclusive Avco feature.)

AVCO
Research & Advanced Development division

Avco's special PlasmaGun booklet describes the complete system. Send for your free copy right now!

AVCO Research and
Advanced Development Division
Dept. 9-2, Wilmington, Mass.

Please send free information about new PlasmaGun system.

Name_____

Organization_____

Address_____

City_____ Zone_____ State_____

Title_____

INDUSTRIAL BRIEFS

Aeronautics Award — Jerome Lederer will receive the Daniel Guggenheim Medal at American Society of Mechanical Engineers ceremonies November 30. He is director of the Flight Safety Foundation and Cornell-Guggenheim Aviation Safety Center, New York. The medal is for notable achievement in the advancement of aeronautics and is sponsored by American Society of Mechanical Engineers, Society of Automotive Engineers and Institute of Aerospace Sciences.

Swedish Step — Fagersta Steels, Inc., Swedish steel producer, is building a new national U. S. headquarters at West Caldwell, N. J. It will consolidate office, warehouse and distribution functions now in New York City.

Engines Roll—Production of Allis-Chalmers engines has started in a new facility at the company's Harvey, Ill., works. The new plant has four semi-automatic assembly lines which can produce more than 130 variations of four and six-cylinder diesel, gasoline butane, and gas engines.

White Building Dedicated — Metallurgical scientists from all parts of the U. S. will attend the Oct. 10 dedication of the Charles M. White Metallurgical Building at the Case Institute of Technology. The $2.7 million building at the Cleveland institute is named for C. M. White, Case trustee and former president and chairman of Republic Steel Corp.

Headed Abroad—H. B. Emerick, director of technical services for Jones & Laughlin Steel Corp., has been appointed technical adviser on the United Nations delegation to the 26th session of the Steel Committee of the United Nations Economic Commission for Europe. The delegation will meet with groups from 20 other nations at Geneva, Switzerland, Sept. 21-28.

Power on Foot—The new products laboratories of Westinghouse Electric Corp. have delivered to the U. S. Navy Bureau of Ships a portable "back-pack" generator. The thermoelectric generator is an experimental electric generating plant capable of producing militarily useful amounts, but is light enough to be carried by one man.

Northwest Growth—Air Reduction Pacific Co. has built a helium compressing plant at Portland, Oregon. The $250,000 plant is the second such facility to be built on the West Coast by the parent company, Air Reduction Co.

SKF Diversification — SKF Industries, Inc. has formed a new division, Automotive Products Div. It will market a complete line of ball bearings, tapered roller bearings, clutch throwout bearings, cylindrical roller bearings. Trade name for the line is "Nice."

Faster Fasteners—Production of Bethalume (aluminum coated) steel fasteners is being enlarged at Bethlehem Steel Co.'s Lebanon, Pa., plant with installation of improved and enlarged facilities. The plant is moving from pilot production to operation on a tonnage basis with additional fluxing, rinsing, and handling equipment.

Merger Locked Up—Cole National Corp., leading maker of key blanks and key cutting equipment, has purchased Sterling Industries, Inc. Sterling, Cleveland manufacturer of aluminum, steel, and plastic products, will operate under its own name as a semi-autonomous subsidiary.

Controlled Tests—Automotive Div., Clark Equipment Co., has opened a new engineering test laboratory at Jackson, Mich. It speeds up pre-testing of prototypes and custom-designed units under controlled conditions. It also eliminates 75 pct of field testing of mechanical and hydraulic transmissions and torque converters.

Three-in-One—Three companies have formed Molecular Dielectrics Inc., with corporate headquarters at Clifton, N. J. It will explore the molecular sciences for new insulating materials. The consolidating companies are Electronic Mechanics Inc., Clifton, N. J.; Mykroy Inc., Chicago; and Mykroy Mfg. Co. Inc., Andover, N. J.

Chemical Action — Chemical Products Div. of Chemetron Corp. has established a chemical specialties department built around existing product lines for metalworking and marine industries.

For Basic Research—Kennecott Copper Corp. will build a new Basic Research Laboratory in the Lexington Park section of Lexington, Mass. The new research initiative is aimed at obtaining fundamental knowledge of the wide range of metals handled by the company.

Newer and Larger — Precision Castings Corp., an affiliate of Detroit Industrial Products Corp., has moved to larger facilities in Oak Park, Mich. New induction furnaces with melting capacity up to 3000 lb have been installed.

Headed for Park Site—Federal-Mogul-Bower Bearings, Inc., will acquire the first laboratory site at the Greater Ann Arbor Research Park at Ann Arbor, Michigan. Construction of the 23,200-sq ft structure will begin next spring.

Biggest for Service — General Electric Co. will build a multi-million dollar Cleveland Service Shop, called by the company the nation's largest industrial apparatus repair facility. The shop will overhaul locomotives, steam turbines and generators, transformers, and industrial motors of all sizes.

And More Research — Rheem Manufacturing Co.'s Container Div. has opened a new research and technical center at Linden, N. J. at the divisional headquarters. The facilities will expand the company's studies of new processes and techniques for application of coatings to containers produced by the division.

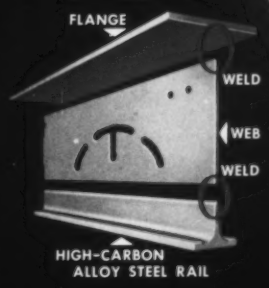
A NEW
HEAVY-DUTY OVERHEAD TRACK BY CLEVELAND TRAMRAIL

TARCA TRACK

- **Completely new - - in design - - in fabrication**
- **Assures more years of heavy-duty service**
- **Great rigidity** ■ **Maximum strength with minimum weight**
- **Design readily proportioned to suit any load condition**
- **Overcomes track peening** ■ **Greater range of sizes**
- **New support fittings expedite erection**

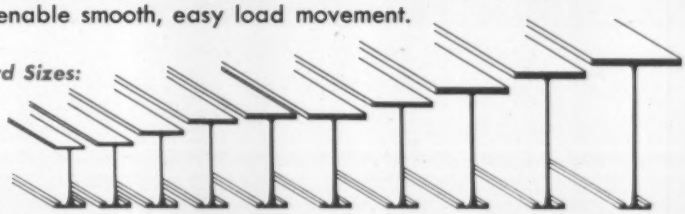
Cleveland Tramrail Tarca Tracks are a tremendous innovation in the overhead materials handling field. Another great improvement among many by Cleveland Tramrail to keep it far in the lead.

Tarca Tracks are straight, true, accurate—have flat raised treads—of hard, high-carbon alloy steel—prevent peening—provide greater wear resistance—enable smooth, easy load movement.



Tarca Tracks are made under carefully controlled conditions. The three parts, top flange, web and alloy steel rail, are joined by continuous welds to form an integral one-piece section.

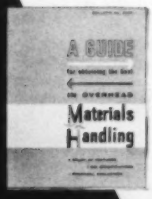
10 Standard Sizes:



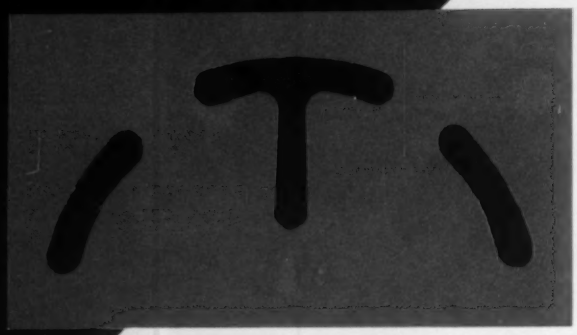
Sizes range from 8″ to 20″. Also special sizes are easily made to suit any overhead crane or monorail requirement. Tarca Track matches with existing Cleveland Tramrail track installations.

Ask for this helpful booklet—No. 2032

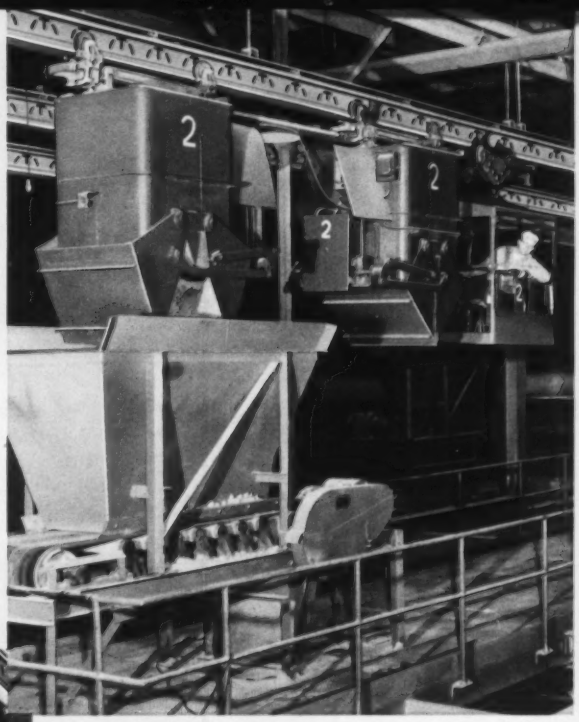
Covers all major features the buyer should know about overhead materials handling equipment. Has complete story on Tarca Track. Contains detailed equipment specifications and handy proposal evaluation form.



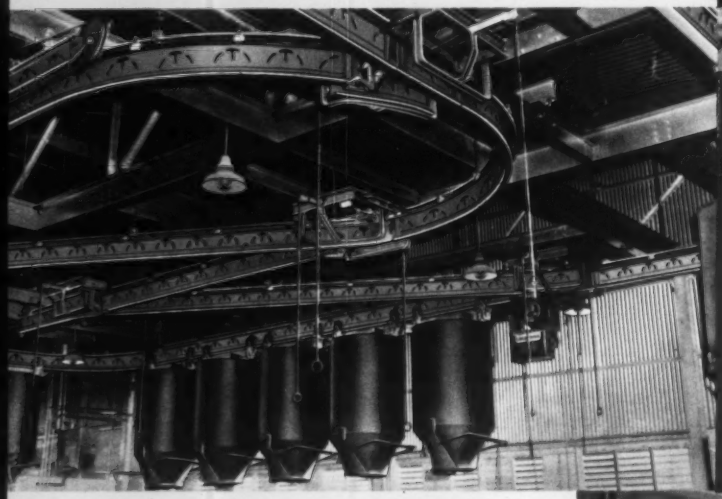
CLEVELAND TRAMRAIL DIVISION
THE CLEVELAND CRANE & ENGINEERING CO
5899 EAST 284th STREET · WICKLIFFE, OHIO



Trade—mark of durability and strength —punched into all Tarca Tracks.

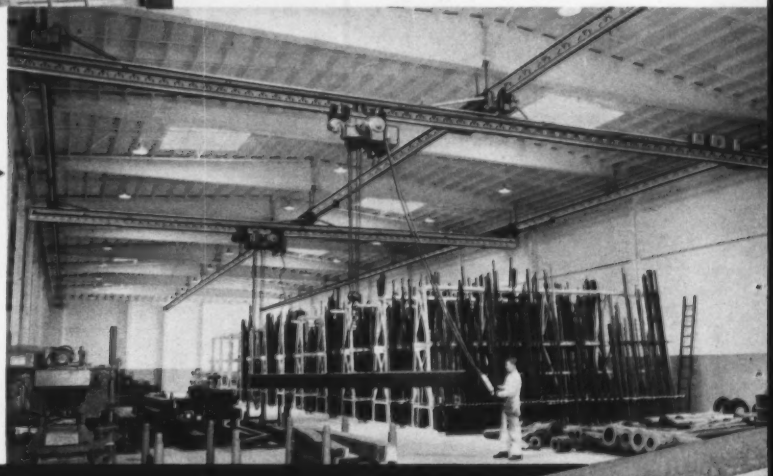


Cleveland Tramrail has an enviable reputation throughout the Ceramic Industry for outstanding performance. Customers have reported that their installations subject to heavy, continual usage are serving them far beyond expectations.



In the Glass Industry Cleveland Tramrail advanced a method of handling mixed ingredients in buckets traveling between mixer and furnaces which prevents segregation. This has proven so successful in assuring uniform quality that today the entire production of many glass plants is dependent upon equipment like that illustrated here.

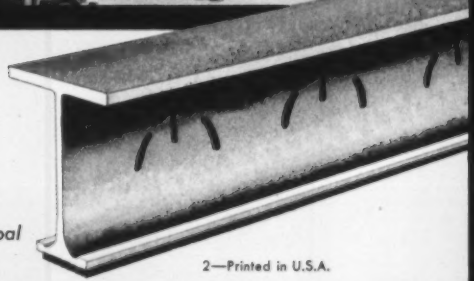
Cleveland Tramrail floor-operated cranes are such an important factor in handling heavy materials and cutting costs that there are now thousands of installations serving factories, mills and warehouses. Tarca Track is of real advantage for crane systems because of its great resistance to deflection.



Your Cleveland Tramrail Sales Engineer is Qualified to give you the Complete Design and Application Story on This Revolutionary

NEW TARCA TRACK

Cleveland Tramrail is represented by competent, experienced engineers in all principal cities of the United States and Canada. Contact address on other side.



2—Printed in U.S.A.

Market Managers Face Big Test

If you direct marketing, you'll find the next decade both difficult and challenging.

Facing a complex, highly competitive market, managers are moving rapidly to improve and increase their efforts.

▪ Marketing managers face a tough, but challenging, future.

Selling will be roughest just when volume is needed to offset rising costs and unused capacity. Getting marketing facts will be vital just when the data will be harder to analyze.

But the rewards will be worthwhile for the manager who can combine skill, imagination, and drive.

Things to Come — What forces will shape industrial markets in the 60's and 70's? What steps will marketing managers take to meet them?

Here's what to expect, based on talks by experts at the recent National Industrial Conference Board Marketing Conference in New York:

The varied economic forces will present marketers with a mixture of the good, the bad, and the uncertain, according to B. F. Stacey, vice-president, the First National Bank of Boston. He predicts an era of rugged competition because of the "population explosion, changing national tastes, the desire for security, an enlarging role of government, a drastically altered world environment, and a flood of new products and services."

Analyzing these influences, Mr. Stacey makes these predictions:

Market Structure: "Rapid and far-reaching shifts are expected in the sixties and beyond. The technical and cultural revolution, plus the rising educational level, will change many personal values and tastes, and radically alter spending priorities."

Government's Role: "Big government seems likely to become bigger not only because of expanded defense spending but also because of the trend toward providing more welfare services, both in quantity and breadth. In the process, governments will become more important customers for many nondefense goods and services, thus affecting market planning."

He lists some of these influences on marketing: The shifting balance among research and development contracts and production runs, new weapons systems, radical changes in geographic areas of expansion to allow for the huge spending on such activities as the moon shot.

World Environment: "The Sixties and Seventies will witness a less dominant role for the U. S. in the Free World . . . Marketing will experience a period of the most intense competition in our history, with the most efficient industrial nations of all time. (But) wide sales opportunities exist in foreign markets."

. . . But Have Answers Ready

▪ Against this background, other speakers saw these trends shaping up in the next ten years or so:

Closer Control: "I think we'll see a stricter, tighter management and the blunt, straightforward executive who drives ahead in spite of formidable obstacles. . . . There has been too much emphasis on theory in marketing, and too little on the human forces . . . Organization and charts are essential but only dedicated, hard-working people can bring them to life to create sales and profits."—S. D. Cowan, vice-president, commercial marketing and international services, Raytheon Co.

Responsibility — "New product coordination should not be positioned within marketing or as a part of research and development. It's a staff function of administrative management. The person responsible for new product coordination should report to the chief executive officer."—A. C. Buhler, new products director, S. C. Johnson & Son.

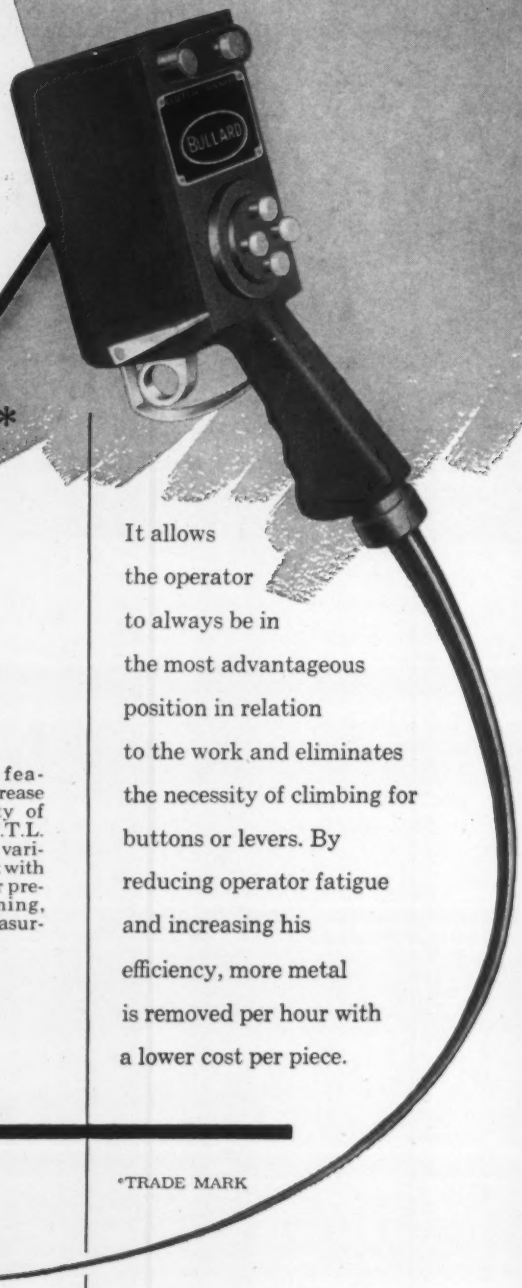
Depth: "The emerging manager will have to be a well-rounded business man . . . because his responsibilities are broadening to include having the right product, a price which will attract business and provide a profit for his company, compelling advertising, sales promotion, adequate servicing, market and product research and sales and production forecasting."—C. F. Manning, vice president, Reynolds Metals Co.

FINGER-TIP CONTROL

Increases Productivity of...

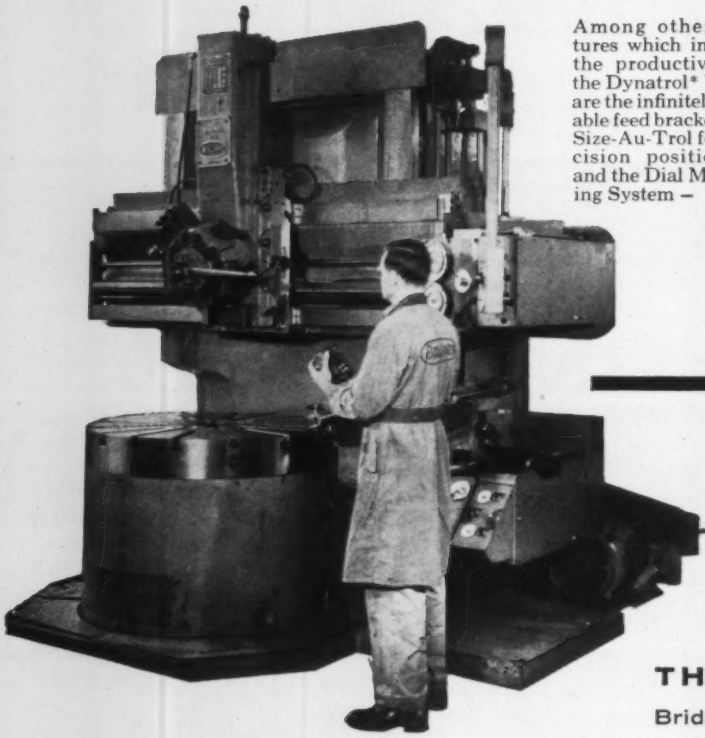
BULLARD

DYNATROL*
VERTICAL TURRET LATHES



Directional control of all head motions in feed on traverse, either horizontally, vertically or at any 45° angle, as well as table start and stop from a lightweight portable pendant, is a distinct production advantage.

It allows the operator to always be in the most advantageous position in relation to the work and eliminates the necessity of climbing for buttons or levers. By reducing operator fatigue and increasing his efficiency, more metal is removed per hour with a lower cost per piece.



Among other features which increase the productivity of the Dynatrol* V.T.L. are the infinitely variable feed bracket with Size-Au-Trol for precision positioning, and the Dial Measuring System –

*TRADE MARK

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Bridgeport 9, Conn., Telephone EDison 6-2511

YOU CAN'T BEAT A BULLARD

Buick Weighs Cast Vs. Aluminum

Cast Iron V-6 Replaces Aluminum V-8 on The Special

Buick officials are convinced the 1962 Special with its V-6 engine will appeal to a wider market of car buyers.

Cost difference between aluminum and cast-iron engine may be another reason for change.
By A. E. Fleming

■ E. D. Rollert, Buick general manager, is playing hot potato with questions about the cast iron V-6 that's going into the compact Special in 1962.

An aluminum V-8 went into all Specials in 1961 but will be standard equipment only in luxury Specials in the coming year. The V-6 will be standard in lower-price Specials.

What's the Reason—What does Mr. Rollert say about the V-6 arrival? Are he and his engineers disillusioned with the aluminum V-8 or is it strictly a matter of getting the Special price down to compete better with compacts such as Tempest, Corvair, Falcon and Comet.

"Reason for bringing out the V-6," says the Buick chief, "is that we want to be a front runner in six-cylinder engines. We've done a lot of development work on the V-6 and it has superior characteristics in every department to inline Sixes."

"The industry will sell about 40 pct six-cylinder engines cars this year. The many people with a loyalty to the six are now potential Buick customers. We've broadened our sales possibilities by adding a V-6 as a running mate to the V-8."

Less Expensive—Naturally, the smaller cast iron V-6 means a cheaper price for the Special. Or as Mr. Rollert puts it, "Cars with six-cylinder engines, other things being equal, sell for less money than the same car with an eight cylinder engine."

Mr. Rollert stresses that he's not unhappy with the V-8, although rumors to that effect have been widespread. "I don't see anything wrong with having an aluminum V-8 and a running mate in the iron V-6.

"We get certain features out of aluminum such as better heat conductivity. We use a higher compression ratio in the aluminum engine for a given kind of gasoline than we can with cast iron and we get the advantage of lightness that goes with aluminum throughout."

Cost Comparison—The cost difference between cast iron and aluminum has been bandied about.

Just what is the cost difference between Buick's V-6 and the V-8?

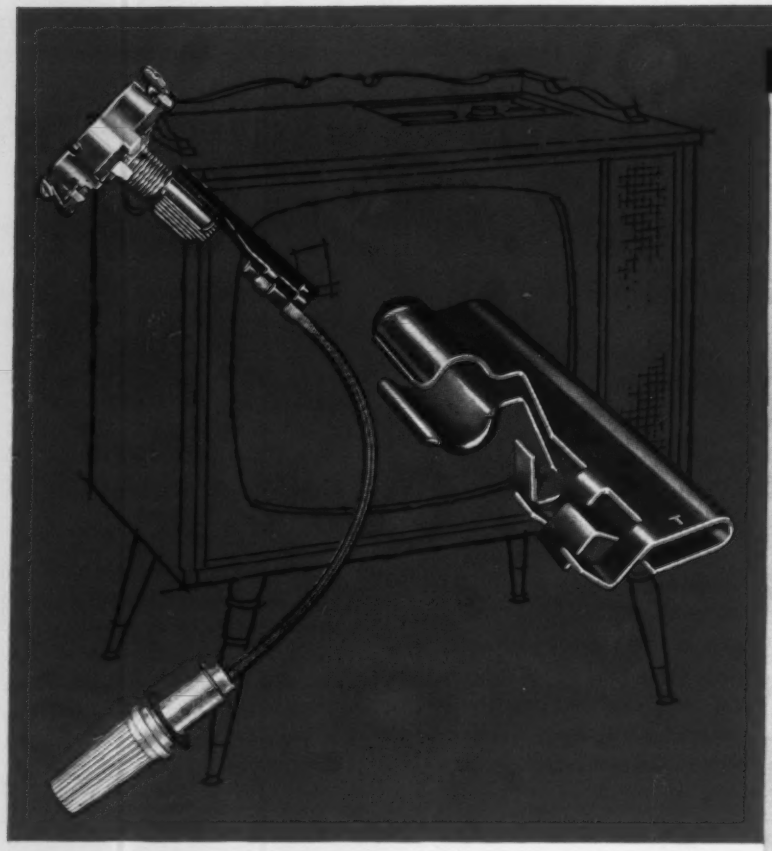
Mr. Rollert won't say exactly. "We've had much more experience with iron so the processes are perfected," he comments.

"Aluminum as metal per cubic inch is more expensive than iron per cubic inch. Aluminum poured as aluminum alloys is worth about 26 cents a pound. Iron is worth about 4.5 cents a pound. If you equate for a three to one difference in density, you still have aluminum more expensive per cubic inch."

Something Borrowed and Something New

BUICK: LeSabre two-door hardtop has a metal roof with styling borrowed from the softtop convertible. It has a 401-cu in. V-8 engine.

CHEVY II: This new, in-between size Chevrolet has an overall length of 183 in. Four- and six-cylinder inline engines are available.



A Tinnerman T-Marked Original...

SPEED CLIP® gives Sylvania easier, more reliable, more flexible assembly

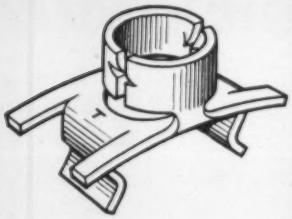
This new Tinnerman-engineered SPEED CLIP fastener provides a faster, more flexible connection between control "pots" and knobs on a TV manufactured by Sylvania Electric Products, Inc. The fastener can be applied wherever similar components are mounted and space limitations pose an assembly problem.

Several advantages are offered over methods previously used. Assembly is easier and faster . . . mating parts are simply pressed together and secured under live spring tension. Built-in ratcheting action permits overload slippage to protect the control from over-adjustment. Designed for use with a flexible cable, mounting of the control is completely independent of the knob location. They can be perpendicular to each other anywhere within 360°. Finally, this fastener is stamped with the Tinnerman T-mark, as are all SPEED NUT® brand fasteners. This is your assurance that Tinnerman quality and total reliability are going into your products wherever these fasteners are specified.

For samples, literature, prices, call your Tinnerman sales office . . . listed in the "Yellow Pages" under "Fasteners." Or write to: *Tinnerman Products, Inc., Department 12, P. O. Box 6688, Cleveland 1, Ohio.*

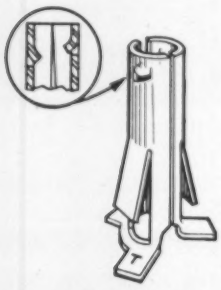
TINNERMAN
Speed Nuts®
Look for the Tinnerman "T"

T-MARK ENGINEERED SPECIALS



TRANSISTOR CLIP saves weight and space, snaps quickly into panel . . . no screws, rivets. Designed for coil form retention, this SPEED CLIP fastener proved ideal for fastening transistors. Tubular retaining collar has excellent heat sink properties, openings at sides and bottom allow air circulation.

FRONT MOUNTING SPEED CLIP FASTENER cuts front panel assembly costs on popular washer-dryer. Unique self-retaining SPEED CLIP fastener permits simplified front mounting for easier, faster, lower cost assembly of front panel. No welding, staking, screw driving . . . ends scrap hazard. Four fasteners engage panel mounting flange as it slips in place over curved spring fingers. Assures firm vibration resistant assembly, yet easy removal for servicing.



BOWDEN CABLE CLIP is one of many Tinnerman designs to fasten armored cable. Designed for car instrument panels, it's the perfect answer to through-panel cable fastening problems. No welding, staking, clinching, no special mounting brackets or clamps. Live spring tension prohibits vibration . . . prevents loosening.

CANADA: Dominion Fasteners Ltd., Hamilton, Ontario. GREAT BRITAIN: Simmonds Aerocessories Ltd., Treforest, Wales. FRANCE: Simmonds S.A., 3 rue Salomon de Rothschild, Suresnes (Seine). GERMANY: Mecano Simmonds GMBH, Heidelberg.

New Defense Orders Flow In

Big Prime Contracts Boost Farwest Business

A healthy slice of prime contracts in the military buildup is boosting West Coast business.

With major companies starting on new defense orders, subcontractors will be vying for shares in the $1 billion boom.
By R. R. Kay

■ Many are not aware of the terrific impact defense has on the nation's economy.

Too few metalworkers realize that 25 pct of all capital goods goes to this market. And 50 pct of all industrial research is paid for by the Defense Dept.

The West Coast gets a healthy slice—over 25 pct of the Pentagon's prime contracts.

Who Got What—It was predicted (IA, August 10, 1961, p. 52) that the military buildup would mean $1 billion in new manufacturing contracts for the West Coast.

They've started to flow in. For executives interested in getting subcontracts, here's a rundown of who got what:

Douglas Aircraft was given an $83 million contract. The company will build 200 A4D Skyhawk attack bombers for the Navy.

North American Aviation gets $140 million. The money will go to build a giant upper-stage rocket for use with the Saturn.

General Dynamics/Pomona, Calif., just got a $59 million order to continue making the advanced Terrier and Tartar supersonic guided missiles.

Boeing is in line for a $66 million contract to build 135 jet transports. And it has a whopping $86 million in new money to speed work on its Dyna-Soar space vehicle.

Common Awards — New orders in the $2 million to $10 million range are common.

The entire Coast, from San Diego to Seattle, is feeling the full impact of the Administration's beefed-up military spending. Defense-oriented industries can look for an even more furious pace.

Lockheed has a $92.7 million Navy contract. It's for production of P3V1 Orions — anti-submarine warfare planes. The Orion is a military version of Lockheed's Electra.

Anti-Smog Step

The California Motor Vehicle Pollution Control Board took the first step to control auto smog.

It approved a crankcase emission device developed by the AC Spark Plug Div. of General Motors. Estimated cost, including installation: from $10 to $40.

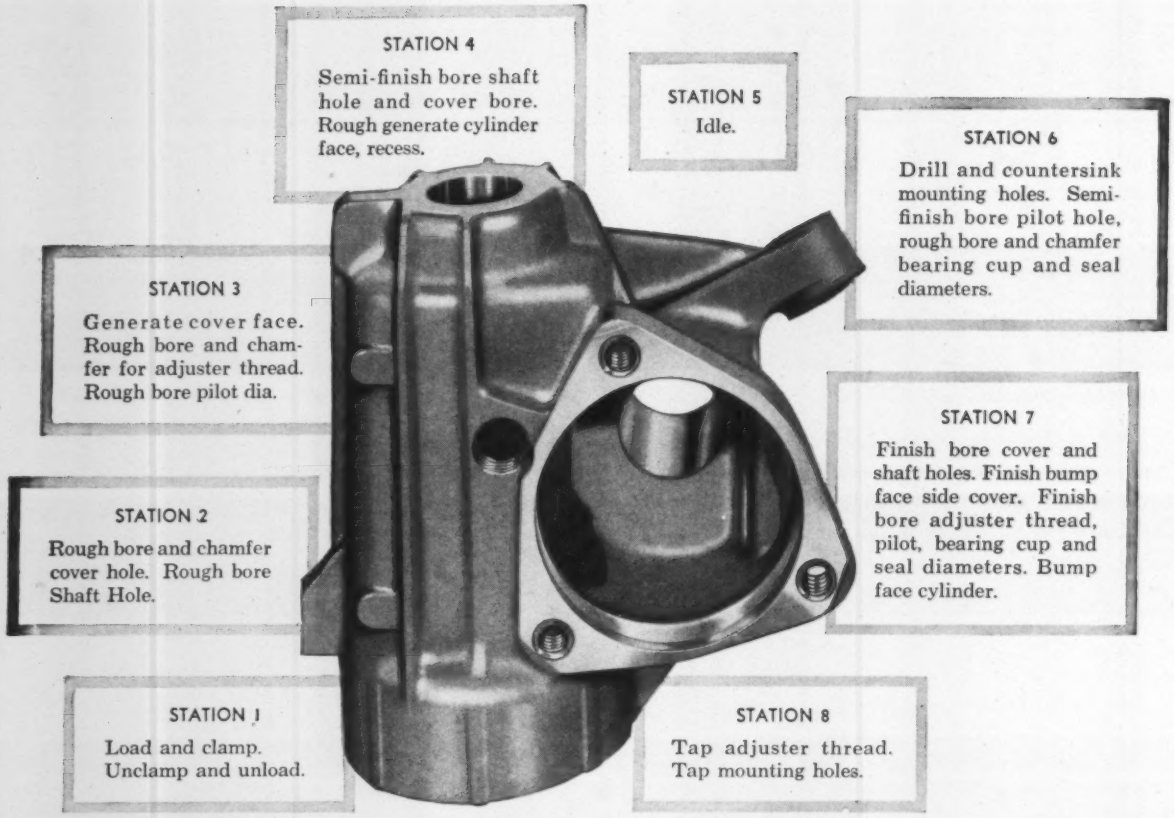
But two crankcase devices need CMVPCB approval. Then, by law, a year must elapse before they become a must on all California cars.

Healthy Fight—Meanwhile, controversy rages. Some members of the Board claim the device fails to meet health dept. control standards.

And many experts working on the auto-smog problem believe that the solution is still a year away. They don't see any relief until exhaust control devices are perfected.

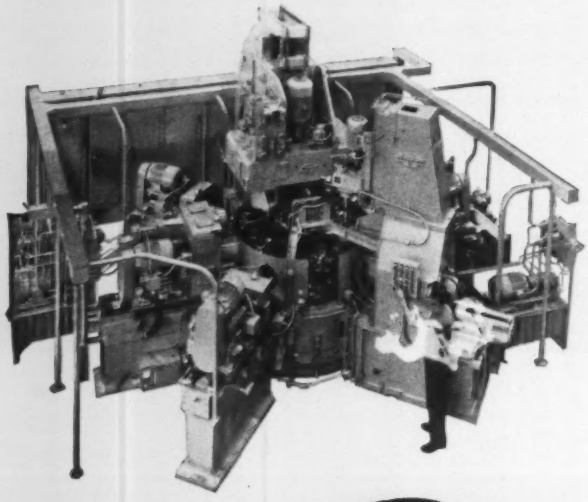
Chevrolet-Fisher Body Goes West

MODEL PLANTS: Two new plants for Chevrolet passenger cars and trucks will be built at Fremont, Calif. Studying a 3-dimensional model of the plants are E. N. Cole (left), general manager of Chevrolet Motor Div., and E. C. Klotzburger, general manager of Fisher Body Div.


STATION 4
Semi-finish bore shaft hole and cover bore. Rough generate cylinder face, recess.
STATION 5
Idle.
STATION 6
Drill and countersink mounting holes. Semi-finish bore pilot hole, rough bore and chamfer bearing cup and seal diameters.
STATION 3
Generate cover face. Rough bore and chamfer for adjuster thread. Rough bore pilot dia.
STATION 7
Finish bore cover and shaft holes. Finish bump face side cover. Finish bore adjuster thread, pilot, bearing cup and seal diameters. Bump face cylinder.
STATION 2
Rough bore and chamfer cover hole. Rough bore Shaft Hole.
STATION 1
Load and clamp. Unclamp and unload.
STATION 8
Tap adjuster thread. Tap mounting holes.

153 Aluminum Steering Gear Housings per hour

automatically processed on this GREENLEE Machine



This Greenlee 8-Station Horizontal and Vertical Spindle Machine is establishing some excellent performance records for a leading automotive manufacturer. The 52 inch table carries 8 work fixtures. Each has power clamping. To insure rigidity and accuracy, the table is clamped hydraulically metal to metal. Indexing is fully automatic. Cycle time is 23.5 seconds. Like all Greenlee machines it's built for long, continuous service. Can be modified economically if desired. Have our representative give you complete information.

MACHINES DESIGNED
WITH THE FUTURE IN MIND

PRODUCTION MACHINERY

GREENLEE BROS. & CO.

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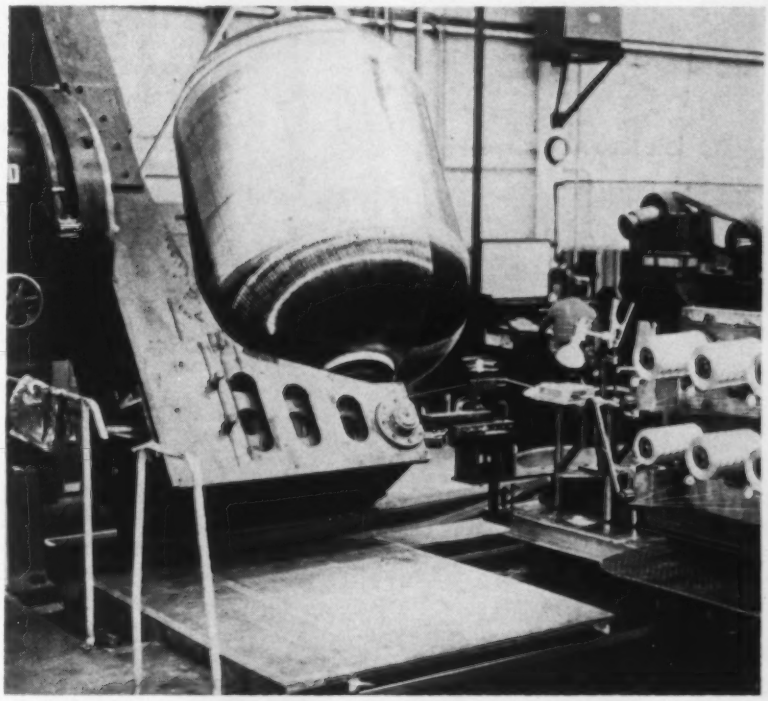
TRANSFER MACHINES • SPECIAL MACHINES • AUTOMATIC BAR MACHINES • WOODWORKING MACHINES AND TOOLS
DIE CASTING MACHINES • TRIM PRESSES • HYDRAULIC AND HAND TOOLS • COMMERCIAL CASTINGS

Space Products Take Ingenuity

There Is No Standard Equipment for Many Jobs

It takes plenty of ingenuity to make modern missiles and other space age hardware.

Often, production engineers must develop both the process and the tools to do the job.
By R. H. Eshelman



SPACE WEAVING: A long-bed missile lathe functions here as a textile rover for "weaving" glass filaments into a case for rocket fuel.

▪ Tooling for space age manufacturing calls for ingenuity and versatility. Many times no standard equipment is available to do a job. Then to get the work done the production engineers must devise or develop a process and the tools as well.

An example is a unique new process developed by the Aerojet-General plant at Azusa, Calif. It's used to fabricate high-strength, lightweight fuel chambers. Company engineers had already found one unusual use for their large "missile" lathe, a special machine built by LeBlond.

Wrapped Tight—This operation was a wrapping process for producing long, cylindrical chambers used in primary stages of rocket engines. This method essentially is one of bonding helically-wrapped, thin-metal strips to a lightweight metal shell.

The 55-ft long lathe qualified for this job as it can handle a workpiece up to 45 ft long and 100-in. diam. The wrappings increase pressure vessel strength-to-weight ratios by as much as 30 pct. It gives a corresponding weight savings. Burst strengths are consistently greater than 320,000 psi.

Double Duty—In the second generation Polaris program, propulsion engineers proposed a glass filament chamber for an upper stage rocket engine. To produce this, plant engineers planned to use a soluble mandrel of a plaster of paris-type material. The glass fibers, however, would need to be wrapped in two directions. This would assure the high-strength ratio required.

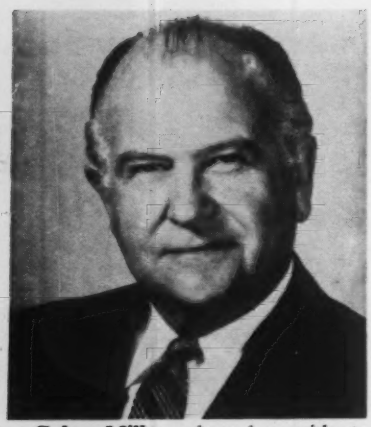
The big metalworking lathe was picked for the job. Instead of being mounted between centers, as in the metalwrapping process, a different setup is used. Tooling people devised a special cradle that attaches to the faceplate of the lathe.

Tumbling Act—With this in position the glass filament winds on longitudinally. The mandrel is tumbled end for end, with the cradle fixture indexing. To finish the winding the mandrel is chucked in a normal horizontal position.

Family Affair—This special lathe, the machine builder reports, is one of a family of such missile machines. They range in size from 72 to 99-in. swings, on 56-in. bed widths, and are powered by 50 to 75-hp motors.

Such specifications reflect the unusual requirements of the new space era. Workpieces in this field are frequently huge but light in weight. Machining operations are likely to be confined to light turning, light grinding, or other specialized process such as coating, wrapping and welding.

MEN IN METALWORKING



Galen Miller, elected president, Towmotor Corp.

R. L. Fairbank, named executive vice president, Towmotor Corp.

B. B. Frost, named vice president, sales, Metals Div., Arthur G. McKee & Co.

Engineering Castings, Inc. — K. W. Rhoads, elected chairman of the board; D. W. Boyd, elected president.

Lockheed Aircraft Corp.—C. S. Gross, elected chairman of the board; D. J. Haughton, named president.

Michigan Chemical Corp.—F. W. Elliott, elected executive vice president.

Federal-Mogul-Bower Bearings, Inc.—J. E. Brennan, named vice president, and general manager, International Div.

U. S. Beryllium Corp.—G. A. Blowers, elected vice president, finance.

Radio Corp. of America—E. S. McCollister, appointed division vice president, marketing, Electronic Data Processing; Dr. J. A. Rajchman, appointed director, Computer Research Lab., David Sarnoff Research Center; R. J. Segal, appointed manager, design engineering; J. L. Owings, appointed manager, engineering, Data Communications and Custom Projects Dept., Electronic Data Processing Div.; M. H. Cattanea, appointed manager, Inter - Divisional Sales, Commercial Systems Dept., Electronic Data Processing Div.

Universal-Cyclops Steel Corp.—W. D. Dickey, elected secretary.

National Beryllia Corp.—T. H. O'Leary, appointed controller.

Beckman Instruments, Inc.—R. A. Lineberger, appointed controller.

Borg-Warner Corp.—J. R. Mueller, appointed managing director, Morse Chain Div.

Allegheny Ludlum Steel Corp.—J. A. Kennedy, named manager, sales office administration; A. R. Herlehy, appointed co-ordinator, Sales Div. records and controls.

D. W. Davis, elected vice president, Stanley Works.

Hackman-Skeehan, Inc.—R. F. Hackman, named president and E. J. Skeehan, named vice president.

Fairchild Stratos Corp.—W. J. Schafer, appointed director, engineering, Aircraft-Missiles Div.

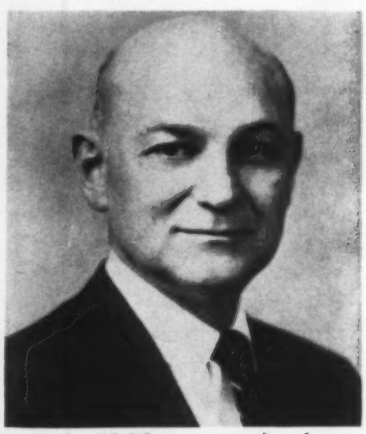
Electro-Mechanics, Inc.—G. W. Cartier, appointed director, product development, Branford Co. Div.

Wyman-Gordon Co.—F. C. Esty, appointed director, raw materials procurement.

McDowell Co., Inc.—R. E. Hess, named general manager, ABC Scale Div.

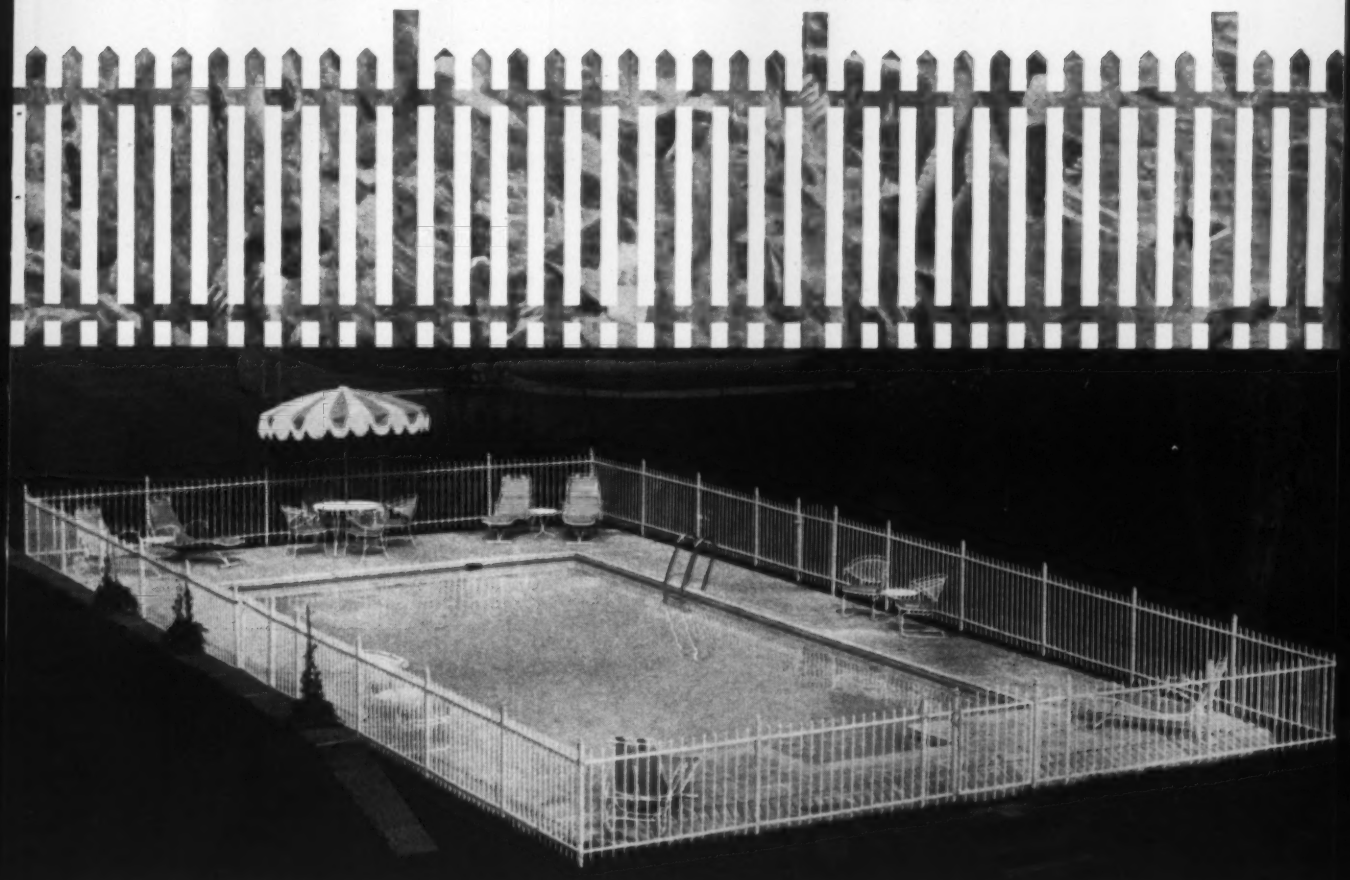
Avco Corp.—W. L. Helbig, Jr., appointed asst. director, marketing, electronics operation, Electronics & Ordnance Div.

(Continued on P. 78)



P. L. McManus, appointed general manager, Standard Pump Div., Worthington Corp.

The rich look of wrought iron, yet Westmoreland's new fencing is . . .



GUARDED BY GALVANIZED STEEL

You're looking at an attractive new idea in fences from Westmoreland Metal Manufacturing Company of Philadelphia. It's a steel fence made of square tubing which duplicates the traditional appearance of wrought iron. But it costs less and virtually eliminates maintenance problems.

It's made of galvanized steel, which means lasting protection from the punishing whims of Old Man Weather. Come rain, come snow, the zinc coating stays on guard for keeps. Galvanized steel also helps hold down the price of this fence because of its low initial cost and the ease with which it can be formed into desired shapes.

WEIRKOTE® IN PARTICULAR! The galvanized steel used in this new fence line is National Steel's Weirkote. To the inherent strength, economy and versatility of steel, Weirkote adds enduring zinc protection via the modern continuous process. As a result, Westmoreland president, Irving H. Kutcher, reports: "Weirkote comes through our fabricating operation without any harm whatsoever to its protective zinc coating. We never have to worry about chipping or peeling." Weirkote is manufactured by two National Steel Corporation divisions, Weirton Steel and Midwest Steel. Write Weirton Steel, Weirton, West Virginia, for further details.

MIDWEST STEEL
Portage, Indiana

WEIRTON STEEL
Weirton, West Virginia

Divisions of
NATIONAL STEEL CORPORATION

(Continued from P. 76)

Westinghouse Electric Corp.—R. K. McDevitt, named general manager, Atomic Div.; D. W. R. Morgan, Jr., appointed manager, steam system engineering dept., Steam Div.

Automatic Transportation Co.—J. W. McReynolds, appointed manager, Industrial Truck Sales, and E. F. Neuman, appointed manager of service.

Allis - Chalmers Manufacturing Co.—Will Mitchell, Jr., appointed director, Research Div.

Towmotor Corp.—D. M. Wessman, named asst. to the executive vice president; A. H. Roth, named manager, marketing and advertising; W. L. Utley, named asst. to the president.

Malsbary Manufacturing Co.—J. W. Lautenberger, Jr., appointed chief engineer.

R. S. Robinson, appointed director, sales administration, Sales Div., Allegheny Ludlum Steel Corp.

Jones & Laughlin Steel Corp.—J. F. McCarthy, appointed superintendent, Blooming and Hot Strip Mills Dept., Cleveland Works.

Johnson Bronze Co.—M. K. Boatman, appointed chief manufacturing engineer; Edward O'Leary, named materials manager.

Ohio Knife Co.—Jim Gillis, appointed general manager—operations, Mill Sales.

Pittsburgh Plate Glass Co.—J. B. White, appointed general manager, window glass plants.

Bay State Abrasive Products Co.—T. S. Strojny, appointed manager, Bay State Abrasives S/A Luxembourg.

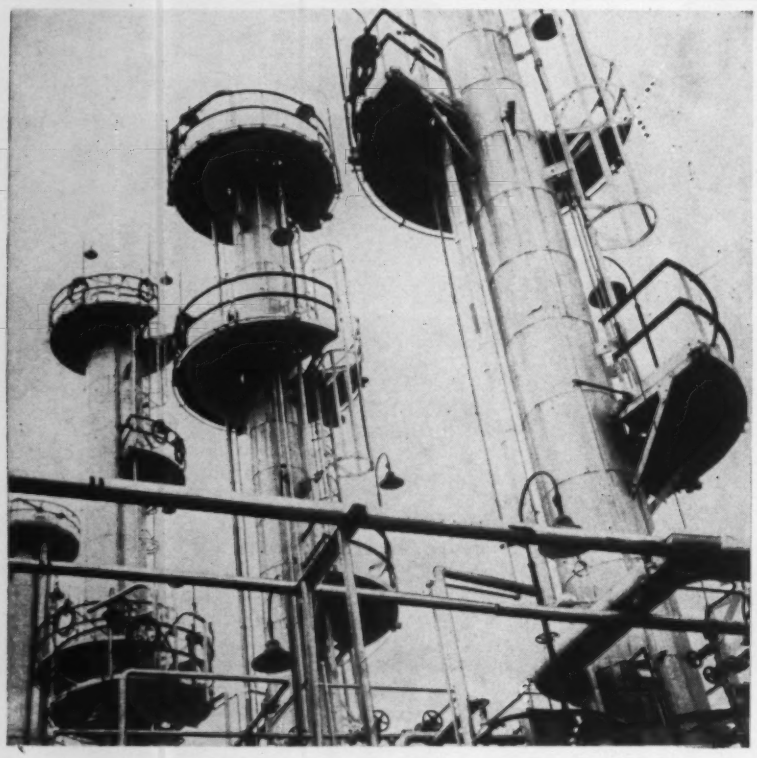
Watts Regulator Co. — J. S. Colter, appointed manager, Industrial Div.

Cal-Tech Systems, Inc. — J. J. Johnston, appointed branch operations manager.

Dresser Industries, Inc.—L. C. Laycock, appointed branch manager, Roots-Connersville Blower Div.

Assembly Engineers, Inc.—C. R. Possell, appointed chief engineer.

Bailey Meter Co.—R. T. Cowan, appointed manager, Chicago district; J. A. Lucas, named manager, Detroit district; R. E. Byers, appointed manager, Milwaukee district.



Industry's main arteries

Stainless steel pipe and tubing carry the lifeblood of industry --particularly in the chemical and petrochemical fields.

Kobe Steel's extruded pipe and tubing, are entirely seamless and completely dependable whether made of steel or alloy steel. Uniform in quality, they have great resistance to extremes in temperature and pressure.
For complete specifications, write for our catalogue.

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Head Office: Kobe, Japan Cable: "KOBESTEEL KOBE"
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Main Products: Tubings—Stainless Steel, Alloy Steel, Carbon Steel. Wire Rods • Bars • Arc Welding Electrodes • General Machinery.

M. D. Lifset, appointed labor relations director, Alco Products, Inc.

General Electric Co. — R. S. Baker, appointed manager, Huntsville, Ala., Center, Computer Dept.

Kaiser Aluminum & Chemical Corp.—J. E. Muller, named district sales manager, Seattle, and R. G. Landgraf, Jr., named asst. manager, can stock sales, Kaiser Aluminum & Chemical Sales, Inc.; G. M. Meisel, named development engineer, Mining and Minerals Div., Kaiser Engineers.

La Salle Steel Co.—Robert Peterson, named manager, steel service center sales.

Minneapolis-Honeywell Regulator Co. — J. A. Bowman, named utilities market manager, Philadelphia; G. S. Raab, named branch sales manager, Detroit; W. B. Wells, named branch sales manager, Dayton; J. W. Larsen, named branch sales manager, Cincinnati; R. A. Lewtas, named training coordinator and application engineer, Cleveland. All of Industrial Products Group.

Electric Autolite Co. — D. M. Brown, named product manager.

Air Reduction Sales Co.—L. J. MacLennan, Jr., named asst. manager, distributor sales, Midwestern region; R. B. Calhoun, appointed asst. manager, distributor sales, Pittsburgh district.

Pittsburgh Metals Purifying Co.—Jack Hill, named manager, Chicago sales office.

Stanley Works—W. H. Wishart, appointed sales manager, industrial hardware, and L. H. Gillette, appointed marketing manager, industrial hardware, Stanley Hardware Div.

Townsend Co.—D. J. Sauser, appointed manager, aircraft sales, Cherry Rivet Div.

H. K. Porter Co., Inc.—Howard Strandberg, appointed asst. general sales manager, Refractories Div.

Colorado Fuel & Iron Corp.—F. S. Burtch, appointed general sales manager, John A. Roebling's Sons Div.; H. S. Christie, appointed asst. director, sales, national accounts; A. J. Bradfield, appointed asst. superintendent, Mechanical Dept., Pueblo plant.

Bridgeport Brass Co. — J. C. Armanino, named Western sales manager; R. W. Frederick, named Midwest sales manager; Douglas C. Grahm, Eastern sales manager.

HANSEN

SERIES HK® QUICK-CONNECTIVE

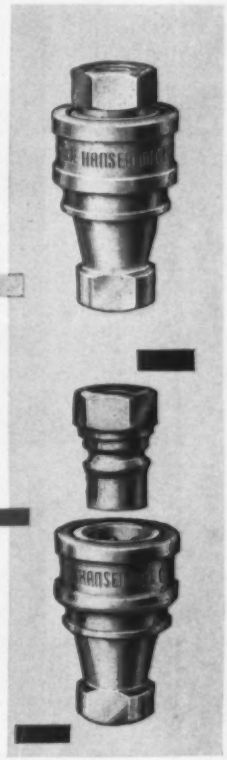
TWO-WAY SHUT-OFF COUPLINGS

QUICK FLUID LINE CONNECTION OR DISCONNECTION

WITH

INSTANT AUTOMATIC FLOW OR SHUT-OFF

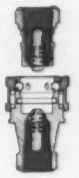
Instantly shuts off both sides of line . . . prevents loss of liquid, gas or pressure



When Coupling is disconnected, identical valves in both the Socket and Plug provide instant shut-off of gas or liquid. To eliminate leakage or spillage during disconnection, the Coupling is so designed that shut-off takes place *before* the Plug separates from the Socket—and *before* the seal of the Socket itself, provided by the Socket "O" Ring, is broken.

In reverse, when Coupling is connected, the "O" Ring in the Socket completely seals Coupling *before* valves release flow of fluid from both sides of line—thus eliminating possibility of spurt of gas or liquid during instant of connection.

Available in brass or steel with female pipe thread connections from ⅛" to 1½" inclusive—also up to 1" in stainless steel.



Write for the Hansen Catalog

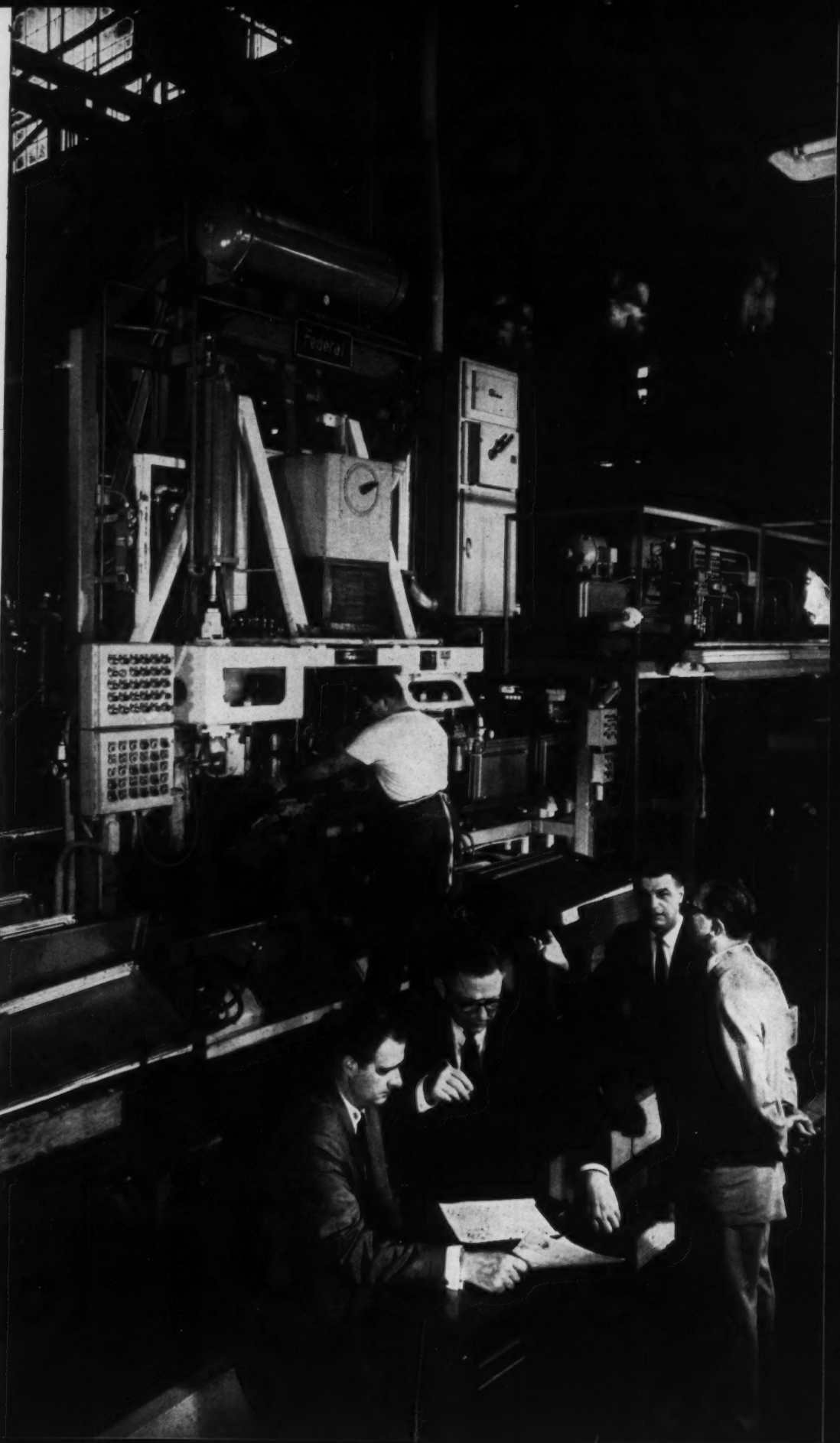
Here is an always ready reference when you want information on on couplings in a hurry. Lists complete range of sizes and types of Hansen One-Way Shut-Off, Two-Way Shut-Off, and Straight-Through Couplings — including Special Service Couplings for LP-Gas, Steam, Oxygen, Acetylene, etc.

Representatives in Principal Cities . . . see Yellow Pages

SINCE 1915 QUICK-CONNECTIVE FLUID LINE COUPLINGS

THE HANSEN MANUFACTURING COMPANY

4031 WEST 150th STREET • CLEVELAND 35, OHIO

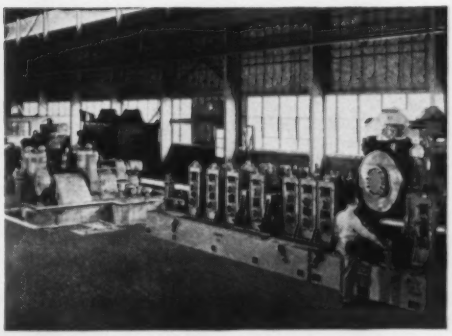


Federal Welding Line at Whirlpool's Evansville, Indiana, refrigerator plant automatically forms and welds together complete food liner shells at a rate of 200 per hour. Here, F. A. Bodenheim, Jr., manager of welder sales for McKay's Federal-Warco Division, goes over latest production charts with H. J. Muehlbauer, director of manufacturing engineering for Whirlpool, as Robert Bussell, sales representative for Federal-Warco, discusses operations with Gene Rommel, general superintendent of tooling for Whirlpool.

Photo by ARNOLD NEWMAN

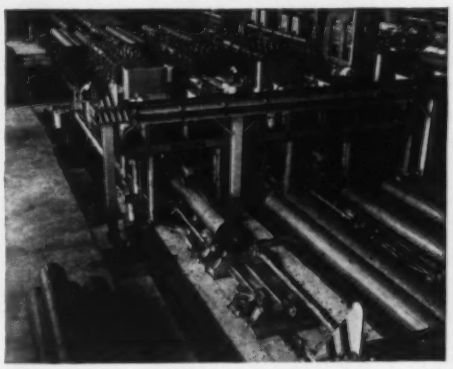
A completely integrated plant . . . a single source of supply . . . one area of responsibility! A new idea? Not really, but an idea that's not easy to bring to reality. McKay Machine has done it for metal fabricators, designing and building equipment to volume produce parts or entire units from raw steel to finished product. ***This is McKay Machine*** We know steel handling . . . we've been designing uncoilers and coil-handling equipment for 30 years. McKay Machine knows welding because the highly respected names of Federal Welder and Berkeley-Davis are now a part of our company. We know processing and forming . . . McKay levelers, tube mills, and cold roll forming machines have been specified by leading industrial firms for more than two decades. And McKay Machine knows stamping, as the Warco Press name testifies. McKay builds the industry's most popular shearing and slitting equipment. Only McKay Machine designs and builds all the components for a truly integrated production line. If you are one of the hundreds of manufacturers who must shave production and handling costs to successfully compete, McKay Machine should interest you. If we do, let us know and we'll meet with you at your convenience. *The McKay Machine Company, Youngstown 1, Ohio.*

McKAY MCK MACHINE

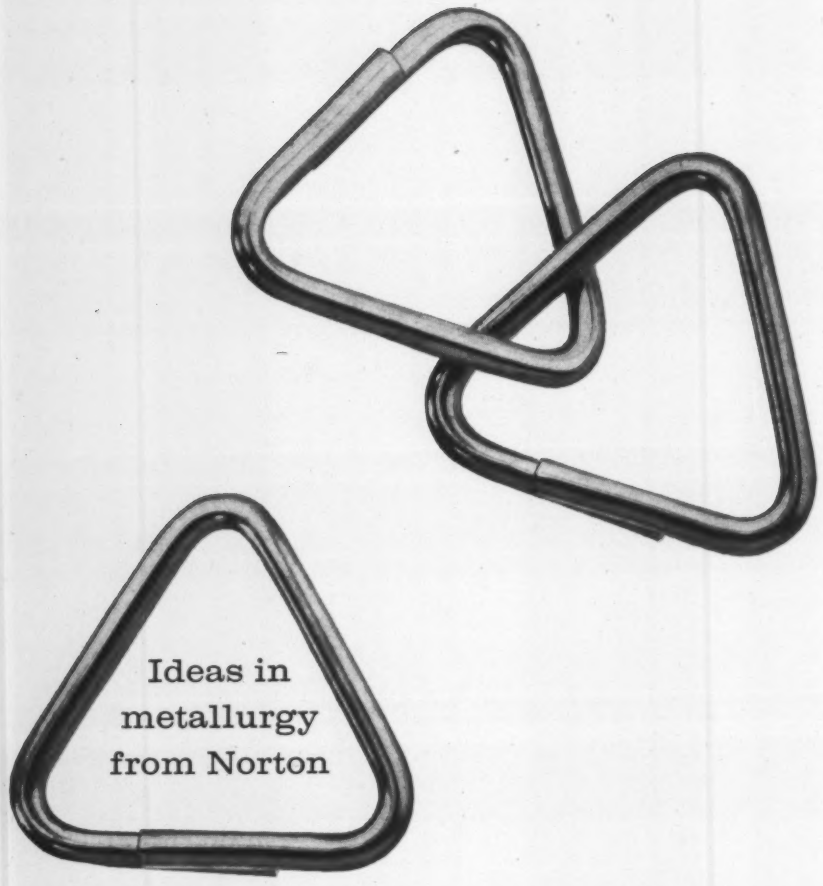


McKay Tube Mills and roll forming machines are considered among the best engineered in the world.

Warco Presses can be found in the leading automotive, appliance and aircraft plants... wherever stamping is a major operation.



Berkeley-Davis Fuston Welding Lines, such as the huge installation above, are used by an ever-increasing number of leading steel fabricators.



Metals are *born* in refractories. And most new ideas in metallurgy call for a new idea in refractory science . . . because a metal can be only as good as the refractory which contains it. Norton makes the finest.

The crucible of the reduction bomb, where uranium and plutonium burst into being, is a Norton product, pure magnesium oxide.

Another Norton material, fused stabilized zirconia, makes possible electric furnacing for processing tungsten and molybdenum, at temperatures up to 2200°C. Zirconia also lines huge pebble heaters and air furnaces in which metals for missiles are tested.

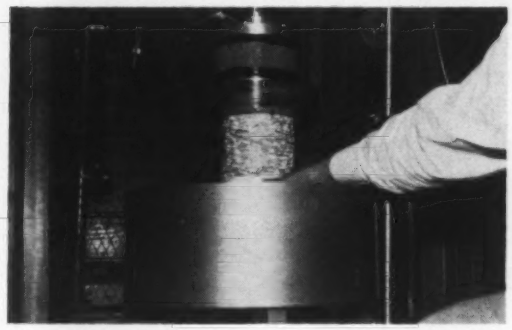
More super-alloys for missiles, submarines and space vehicles are possible through new vacuum melting techniques with high purity fused magnesia made by Norton. And in the aluminum industry, new efficiencies are being achieved with reduction cell linings of silicon carbide and cathode bars of titanium diboride.

In metallurgy as in other fields, Norton is crystallizing ideas into products to solve many problems . . . through oxide fusion and in probing experiments in carbides, nitrides and borides. Norton is ready to work with you in engineering materials to meet your needs. Write NORTON COMPANY, Refractories Division, 208 New Bond St., Worcester, Mass.

NORTON
REFRACTORIES
Crystallizing ideas into products

Why Cylinders Crumple

The childhood pastime of smashing tin cans has graduated to the Space Age. Scientists at GE's Missile and Space Vehicle department will spend the next year in studying the buckling of



BUCKLE DOWN: For landing on the moon.

metal cones and cylinders. Reason: To plan for spacecraft landing on the moon. Already the scientists have found that metal cones and cylinders crumple in a pattern-like fashion.

Heat/Cool With Stainless

Heat-exchange coils made from stainless steel sheet help keep Polaris missiles in shape to deliver an emergency knock-out punch. The solid-fuel system in the Polaris must be kept at a constant temperature to insure proper firing. The plate-shaped heat exchanger is made by welding two pieces of embossed stainless sheet to form a series of coil-like passages through which the heating or cooling medium circulates.

Defer Ownership Ruling

The White House once again is studying the question of ownership of space communications systems. So far, the White House has supported private ownership. But complaints from Congress, where many legislators call for government ownership, have caused space planners in the executive branch to take another look.

How Space Research Pays

Many of the 3200 space-related products developed so far have practical applications on earth. Metal developed for nose cones is now making improved pots and pans. Food studies for space flights are leading to improved nutrition on earth. Spacecraft temperature control studies are suggesting better methods for home heating. Many other economic, medical and even power problems may be solved in outer space.

Apply Adhesive by Spray

A new, high-strength heat-resistant adhesive can be spray applied in a relatively dry form, and requires only contact pressure for bonding a variety of materials. Use of a new spray technique obtains excellent filleting properties. Service temperatures can range from –30° to 250°F.

Speeds Parts Procurement

A novel application of closed-circuit TV is now being used at government-contractor conferences to speed procurement of spare parts. It reduces the need for costly reproduction of hun-

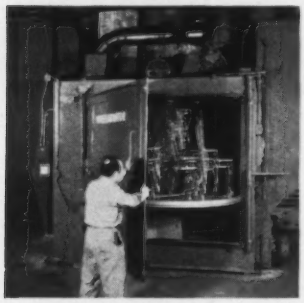
PUT TV TO WORK: Eliminates drawings.

dreds of drawing prints, and eliminates delays caused by circulating each print individually to conference members. Estimated savings per meeting: $4500 in costs, time and manpower needs.

4000 Feet of Welds

It takes 45,000 inches of welding to make up each Project Mercury capsule—24,500 inches of seam and butt welds and 20,500 inches of spot welds, says McDonnell Aircraft, capsule manufacturer. All fusion, seam and spot welding are done in "open air." Fusion welds are inert-gas shielded, tungsten-arc using trailing and backup shields. Spot and seam welding are done on standard production equipment with a technique similar to that used for stainless.

3 minute blast adds years to life of finish



Approximately 30 wrought iron chair frames, plus other furniture components are thoroughly blast cleaned in only 3-minute cycles in this Wheelabrator Swing Table, giving superior results in a fraction of the time formerly required for manual cleaning.

A demonstration of WHEELABR. OR'S

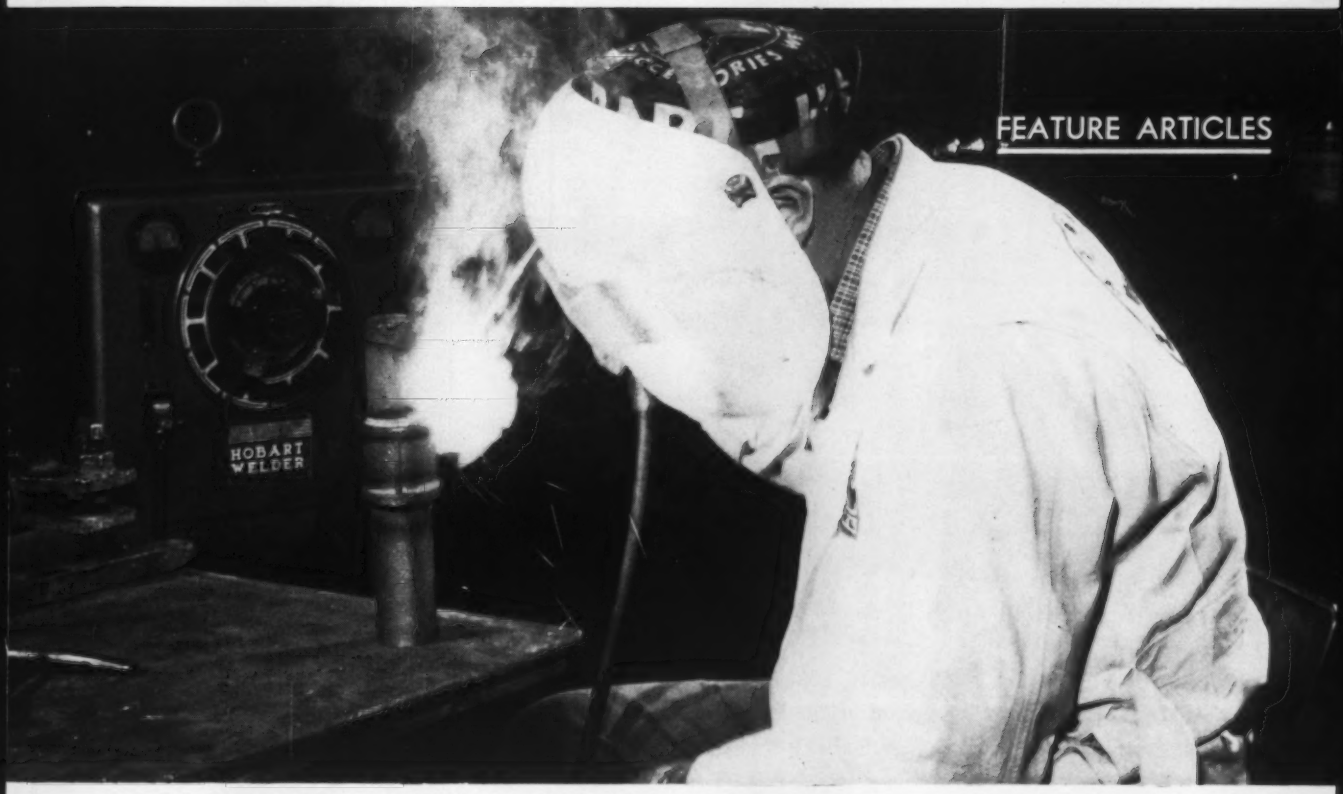
VITAL VALUES

Cost savings are only half the story of the benefits gained by Contempo Frames Co. of Brooklyn, N.Y., since installing a Wheelabrator Swing Table to blast clean metal furniture frames prior to finishing. While production capacity for this work has been multiplied 5 times, the greater benefit has derived from the superior finish now obtained. The uniformly roughened and thoroughly clean surface provides an ideal base for electrostatic enameling, giving smoother, more uniform paint coverage, and vastly improved adhesion to the base metal. The ability to add such sales benefits to a product, while cutting manufacturing costs, is typical of the Vital Values you get with Wheelabrator Airless abrasive blast cleaning.

VITAL VALUES FOR INDUSTRY

WHEELABRATOR
AIRLESS BLAST EQUIPMENT

WHEELABRATOR CORPORATION, 510 S. Byrkit St., Mishawaka, Indiana. In Canada, WHEELABRATOR CORPORATION OF CANADA, LTD. 1901 Birchmount Rd. P.O. Box 490, Scarborough, Ontario
A subsidiary of Bell Intercontinental Corp.



ECONOMICAL ELECTRODE: Inexpensive low-hydrogen electrodes can deposit good welds on malleable iron.

Malleable Iron Moves Up On Weldability Scale

New reports from a battery of sources indicate that malleable is very weldable.

Pay attention to a few basic considerations and you can deposit sound welds with ease.

▪ There are hundreds of reliable malleable castings in use today which are welded to other parts. Recent advances in welding technology suggest an even greater use of this joining medium for malleable in the future.

Like all materials, malleable has individual traits to be considered if welding is selected. Its favorable tensile strength and ductility are created in a controlled heat-conversion process. Any subsequent concentration of heat, such as that applied in welding, can alter the malleable structure in the heated zone.

If malleable's maximum properties are not needed at the joint, or if the welding is done with a minimum of heat buildup, welding is very satisfactory for joining malleable iron to itself or other ferrous materials.

Industry-Wide Study—The subject has been under concerted study recently by several malleable producers and the industry trade association, Malleable Founders Society, Cleveland. In general, the results indicate that malleable castings may be welded.

However, the type of filler wire to be used, the time of exposure to heat, size of the weld, and stress on the joined area are all points for consideration.

The introduction in recent years of several new types of welding electrodes has lessened many previous problems. For instance, it's possible to achieve highly satisfactory results by using a lower temperature welding method, or at least a method that avoids high heat concentration.

Concrete Examples—The oxy-acetylene methods qualify in this respect. Another approach is to slow the rate of cooling which takes place after welding. This can be accomplished by preheating the parts,

MANUAL WELDS: A wide range of electrodes, including low-hydrogen and pure-nickel types, is used to weld malleable couplings to pipe.

which, in effect, reduces the temperature gradient and slows cooling.

Highly ductile filler metals, low-hydrogen electrodes, or a combination involving any of these factors, can improve welded malleable joints.

Low-hydrogen electrodes have won for themselves a very special place in the welding industry because of their ability to weld the so-called unweldable steels. They have also been used successfully on malleable-iron castings.

Low-Hydrogen Electrodes — A feasibility study by the Hobart Brothers Technical School of Troy, Ohio, indicates that a manual process using the low-hydrogen electrode is highly satisfactory for joining malleable fittings to steel pipe.

Several different types of electrodes were used in these tests. All of them were applied on 32510 malleable-iron castings. The results are listed in the first table.

Manual arc welding was reasonably fast for the tests described. In fact, each sample required only 2-3 minutes of actual welding time.

On these tests, malleable-iron couplings were machined for a slip fit over 1½ in. pipe. None of the castings failed below 26,500 psi. The joints made with nickel-alloyed electrodes all withstood 40,000 psi. However, the low-hydrogen electrode was the most satisfactory in terms of performance plus economy.

Semiautomated Method — Gas-shielded arc welding was also studied. This method seems to offer good potential for welding malleable castings in semiautomatic production. Here, the relatively inexpensive mild-steel filler wire gave excellent results, as noted in the second table.

Other methods studied, using a smaller sample, were inert-gas tungsten-arc and submerged-arc welding. Results using tungsten - arc welding were very good.

However, the high cost of the shielding gas and the somewhat slower application of weld metal make this less attractive than the stick electrode and gas - shielded methods. Submerged - arc welding also gave good results. It should be considered for automated production.

Field Report—The Dalton Foundries, Inc., Warsaw, Ind., looked into the possibilities of welding malleable. This company gets good results by welding trailer couplers. Because of the stresses encountered in the part, welding was subjected to a series of exhaustive tests before production quantities were authorized.

The couplers were joined in two ways: Continuous and interrupted welds around the casting. The electrode was a standard 5/32 in. diam low-carbon mild-steel type using 117 amp. The parts received Magnaglo inspection after welding. No cracks appeared in either the malleable section or the weld metal.

A fatigue test lasting 48 hours was performed on the part with a continuous weld, and no cracks appeared. The part with interrupted welds was tested over a 284 ½-

How Coated Electrodes Rate

ELECTRODE TYPE	Diameter, in.	Tensile Strength, psi	Location of Failure
Mild Steel (E6013)	1/8	26,500	Casting
Low Hydrogen (E7018)	3/32	32,300	Weld and Casting
Copper (55 pct)—Nickel (45 pct)	3/32	40,300	Weld and Casting
Nickel (100 pct)	3/32	41,000	Weld and Casting
Nickel (55 pct)—Iron (45 pct)	3/32	40,500	Casting

hour period, simulating 785,000 miles of actual service. Once again, no cracks appeared.

The only way that the investigators could check the weld was to remove the coupler from the steel plate with a sledge hammer. The malleable castings had to be bent out of shape before the joint yielded. The couplers also held up well under static-tension and compression tests.

Sound Joints—Photomicrographs of the welded joint show that no hard iron carbides have formed in the matrix structure. There is evidence of a limited amount of martensite, as close examination has revealed.

Dalton Foundries found that the heat from the welding electrode introduced a thin pearlitic structure at the surface. As a result, tensile strength was actually enhanced.

This strength increase would be hard to duplicate in the normal course of production welding, and it's expected that some loss of strength may take place in the usual application of weld metal to malleable.

Promising Proof — Nevertheless, photomicrographs of several other welded malleable specimens bear out the fact that a "brittle layer" need not form in the heat-affected zone of a welded malleable-iron casting.

The photomicrograph on this page shows a typical welded malleable joint examined by Malleable Founders Society as part of its laboratory service program to members. The malleable iron withstood the temporary exposure to heat very well.

TESTING THE WELDS: All welds made with manual covered electrodes were tested in tension. Nickel electrodes offered the best results.

SAFE HEAT LEVEL: Photomicrograph (left) of welded malleable joint shows that no iron carbides have formed on the right side of the structure. This means that the heat was not high enough to affect the malleable structure and that strength and ductility have been retained. A low-carbon steel electrode was used on this particular part. 500x.

The sensitivity of the malleable structure to high heat will always impose some limitations on the use of welding these castings. But for applications which need less than malleable's maximum properties, conventional welding methods are generally satisfactory.

Judicious spotting of the weld, fast techniques which limit the buildup of heat, controlled cooling methods, and low-temperature electrodes and filler wires can be used to enhance the weldability of malleable-iron castings.

These findings should prompt industry to take another look at the problem of welding malleable.

Gas-Shielded Welds Hold Up

FILLER WIRE	Diameter, in.	Shielding Gas	Gas Flow, cfh	Tensile Strength, psi	Location of Failure
Mild Steel	0.035	75 pct Argon 25 pct CO_2	15	35,400	Weld and Casting
Mild Steel	0.035	75 pct Argon 25 pct CO_2	15	38,400	Casting
Monel	0.035	Argon	25	39,800	Casting
Silicon Bronze	0.035	50 pct Argon 50 pct Helium	30	27,900	Fusion Zone
Aluminum Bronze	0.045	50 pct Argon 50 pct Helium	30	26,800	Weld

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Cleaner Beams Ease Fabrication

Automated Blast-Cleaning Line Raises Quality, Output

Clean structurals offer many advantages to producer and user.

One company turned to blast cleaning since it lends itself to high-speed automated handling.

■ In fabricating large structurals, there's a new trend under way to work with "white" steel. This trend got a quick boost from construction of St. Lawrence seaway bridges. Canadian government specifications at that time began to require all structurals be cleaned to white metal before fabrication.

There are several good reasons for this requirement: Better paint adhesion and longer paint life; more thorough check on possible materials defects; and a sounder finished structure.

To meet this requirement, virtually all Canadian steel fabricators have gone to blast cleaning for economy. Blast cleaning offers the possibilities of mechanizing or automating handling and positive scale and rust removal at high speeds.

Mechanical cleaning offers a big bonus. In addition to improving the end product it also affords some substantial side saving in the fabrication plant. As a result, many structural fabricators in the U. S. are now following suit in this new trend.

At Canadian Bridge Works, Windsor, Ontario, a Wheelabrator mechanical cleaning system is being used in line with a light pickling on parts that require galvanizing.

Says H. J. Anthony, manufacturing engineer, "We find this an economical, positive and fast method for descaling bridge structurals down to the bare metal. In fact, it has proved so desirable we are planning a similar line for our towers prior to galvanizing."

The company finds that the speed of the cleaning operation is a distinct advantage on rush orders and during the busy period. In addition, it's less costly than manual methods.

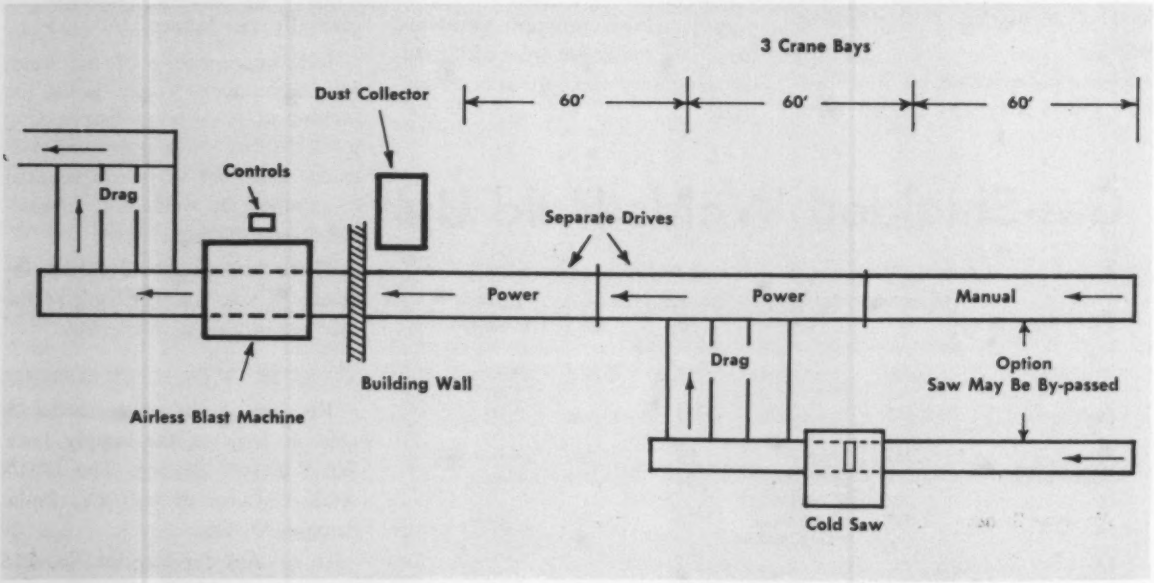
The line handles plate up to 96 in. in width and shapes 36 in. wide x 18 in. high flange. With the mechanical run-in conveyor, it can take stock lengths up to 60 ft. Daily production averages 80 tons.

The new setup begins with the outside structurals storage area. At present, an overhead crane loads pieces onto the cutoff saw table, or the beginning of the in-conveyor. In the future, a power operated drag conveyor will automatically move structurals from the saw to the power conveyor.

This conveyor is a roll-type, controlled either by an automatic cutoff switch or blast machine operator to avoid pile-ups. The airless-type cleaner is located just inside the fabrication building.

The unit's table is a direct continuation of the roller conveyor, giving an in-line automatic feed. Ac-

Structurals Flow From Yard Through System



tual cleaning is done at speeds up to 17 fpm. Usually, a rate of 13 fpm satisfies the premium cleanliness required on Canadian government bridge specifications.

Cleaned pieces exit directly on to a run-out conveyor, controlled from the machine pulpit. A mechanical drag-type conveyor unloads the pieces by lifting them vertically. This allows the shot to drop onto the underfloor return conveyor. Dirt and dust are removed from the shot in a dust collector and shot separator outside the building.

This assures uniform shot for the job. Also negative air pressure from the dust collector in the system prevents puffing at any openings and maintains clean work conditions.

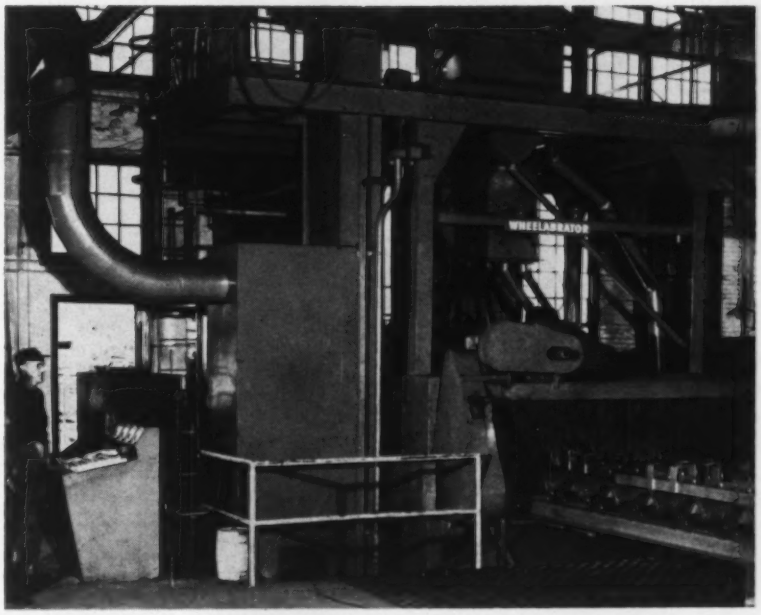
The blast cleaning machine itself is specially designed for fast, efficient cleaning of all structural shapes. Four wheel-type throwing units cover all areas, with rebounding shot taking care of sharp angles.

The material handling arrangement results in good conveyor fill, a high volume of work per hour. With the mechanized setup, cleaning costs run about $1.50 per ton. Higher volume operations can use automatic drag loading and unloading to further reduce costs.

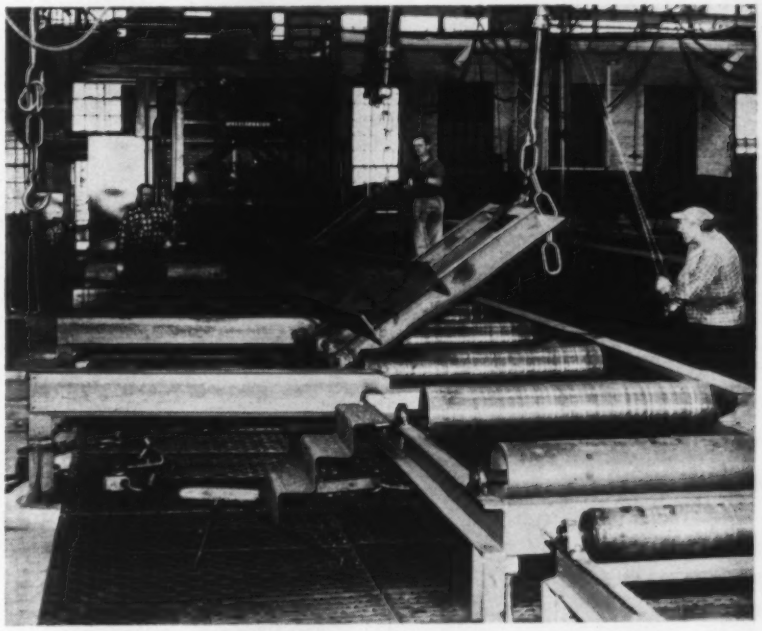
This type of mechanical process leaves a fine-etched surface that affords a number of profitable fringe benefits. One of these is easier layout and faster setup for fabrication.

Welding, operators find, is both faster and better. The same is true of flame cutting of parts. Inspection is easier, more rapid and positive. Measurements of defects can be taken more readily since the white metal instantly shows defects, or freedom from them.

Further, the shop is cleaner. In fact, maintenance costs are considerably less, since man-hours for cleanup have been cut substantially. Shop workers like the new installation too, since it means less plant housekeeping, cleaner working conditions, less dirt on clothing.



FAST CLEANING: Mechanical-type abrasive blast uses four centrifugal impellers for complete coverage. Rebounding shot catches sharp angles.



QUICK FLIP: Unloading cleaned structurals with mechanized lifts, operators turn over flat plates to dump off abrasive residue.

There are some other nice payoffs, too. Previous to use of the white metal specs, structurals fabricators sometimes were forced to repaint completed bridges when the undercoat failed to hold. This cost has virtually been eliminated. Uniform surface with the mechanical process provides excellent bond and tight paint adhesion.

How Castables Speed Patching On Blast Furnace Linings

By **A. E. Frey**—Blast Furnace Dept., The Colorado Fuel & Iron Corp., Pueblo, Colo.

Refractory materials can be used to speed up repairs on idle blast furnaces. How long will these materials last?

Isotopes sunk into the wall give you a progress report.

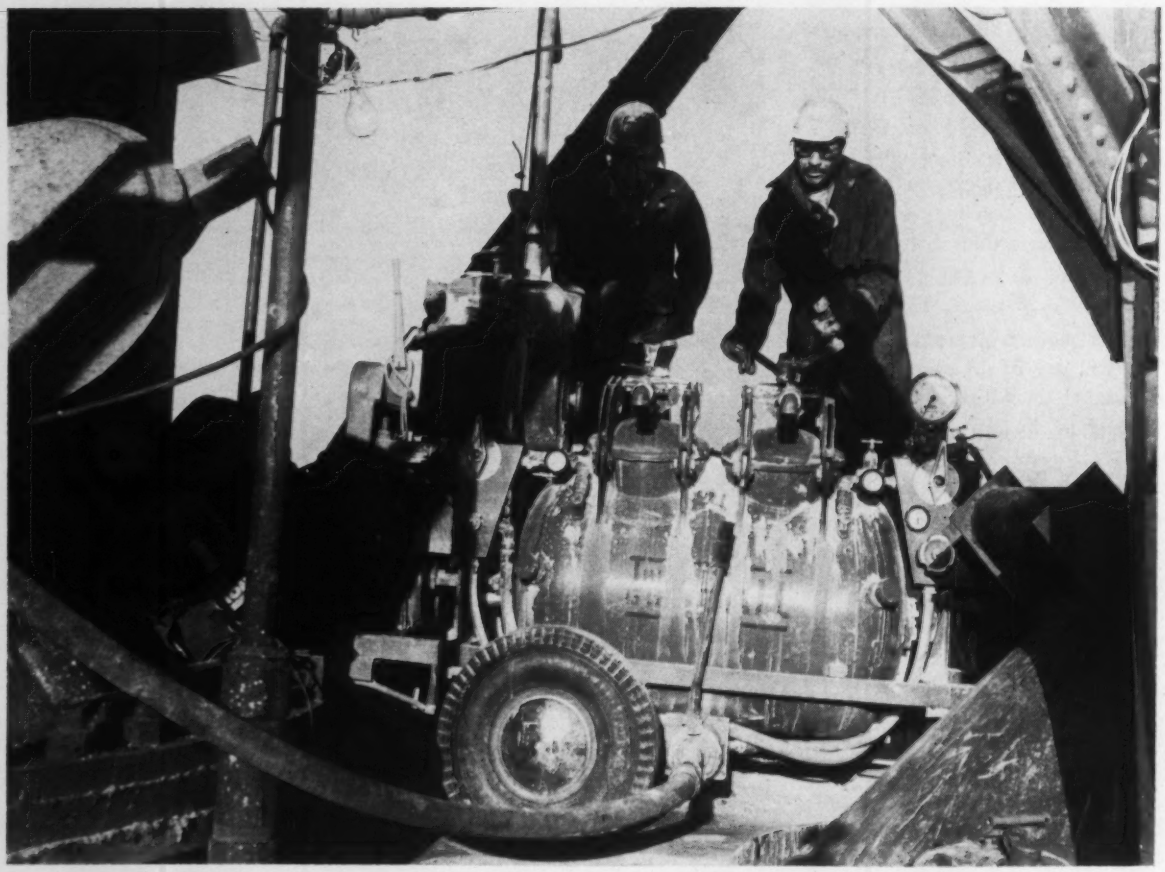
▪ Urgency often provides better ways to curtail blast-furnace downtime. Here's an instance where patching was completed in a matter of days. At the same time, steps were taken to keep tabs on the linings once the furnaces went on wind. There, isotopes were used.

At the close of the steel strike, the bricklayers at the Pueblo, Colo., plant of The Colorado Fuel & Iron Corp. were in heavy demand. Two blast furnaces required prompt relining of the throat sections. Castable refractory was selected for the patch work.

Castables can be applied faster than brick. Regular furnace personnel can handle the task, too, as long as they're properly supervised. Also, castables will last as long as firebrick.

Progress Report — We also wanted to know how long the patch would hold up. Why not bury radioactive materials at key locations throughout the furnaces, then run frequent checks with a Geiger counter? This was done without hindering patching speed.

While the furnaces were still hot, cameras were lowered for initial inspection. As soon as the furnaces had cooled, supervisors entered the furnaces. The larger furnace had lost all of its armor. The smaller



GUNNING MACHINE: Mounted at the top of the furnace, the machine applies the refractory materials.

WATER TREATMENT: To keep the heat down during setting, patched areas in the furnace were sprayed.

START OF BURIAL: Lower sources are placed inside balls of refractory, then pushed in furnace lining.

one had lost many of its wear plates.

One of the brick companies working with us suggested that we by-pass the step of welding anchoring studs to the shell walls. To do this, we would have to locate sound support inside the furnace.

Solid Footing — So we probed through the banking burden in both furnaces. Both times, we found what we needed: a ledge of brick just below the worn throat areas.

The larger furnace only required patching, so we started there. This furnace had a low level of burden; little shoveling was needed. The bell was opened slightly to permit the introduction of materials hoses. The remaining burden was then shoveled into the center of the furnace.

To beef up the ledge, several courses of brick were taken from the top of the ledge. We placed two 8-in. vent pipes in the center of the burden. Then the top of the burden was sealed with a 6-in. layer of soft-setting, special concrete. This unusual approach gave us a working floor which answered our needs.

Finishing Touches — A blower was installed to provide fresh air in the larger furnace. An automatic gas alarm was also installed to safeguard against gas poisoning. Two placement machines were hoisted onto the top platform and air and water connections were made. Finally, the castables were lifted up on pallets.

First job for the machines: Sandblast the remaining brick. Each machine contained two compartments. In one, the material is mixed with water. Intermittent pulses of air force the material out in slugs. The other compartment readies the next batch.

Castable was sprayed in layers several inches deep onto a 22- to 26-in. ledge. By the time we had completed a layer, the first castable was hard enough to start the next ring. Patching was finished in four days. Patch height was 16 ft. The job consumed 143.5 net tons of castable, including spillage and rebound.

Swung Aside — The crew then moved over to the smaller furnace and proceeded to remove part of its top. The big bell was swung to one side. At first, it looked as though just the missing wear plates would require patching.

Further studies disclosed that the remaining armor was loose, so we had to remove all existing wear plates. The burden from this job filled three rail cars. Once again, the remaining burden was sealed with special concrete. A hanging scaffold was then installed.

After the brick had been sandblasted, the refractory was applied in only 15 hours. Here, we used 104 net tons of castable.

Buried Isotopes — The idea of keeping an eye on furnace linings via radioisotopes led us to Tracerlabs, Inc., Richmond, Calif. This company agreed to work with us. After it obtained an AEC license for CF&I, Tracerlabs began training and supervising our own personnel in the handling and installa-

RADIATION CHECK: A trained operator uses a portable counter to make periodic check on the sources. The portable counter is placed next to the permanently mounted detector to keep tabs on the lining.

tainers before dropping them into the holes. Each hole was packed with castable to a depth of about one foot over the sources.

We had to cut through the shell to deposit the lower sources. A 1-in. diamond core drill was used to penetrate the brick. Pipe couplings were welded to the shell around the holes. Then the sources were placed in balls of castable.

Plugging the Holes—After these balls were pushed all the way into the holes, each hole was tamped full of refractory. To seal the shell, pipe plugs were screwed into the couplings.

Geiger - Mueller tubes, inside stainless shells, are now mounted outside the furnaces. Each tube is located opposite a source. There's also a ratemeter in the furnace foreman's office which counts radiation impulses.

Thus, the foreman can always tell whether the radioisotopes are still in place.

tion of materials and equipment.

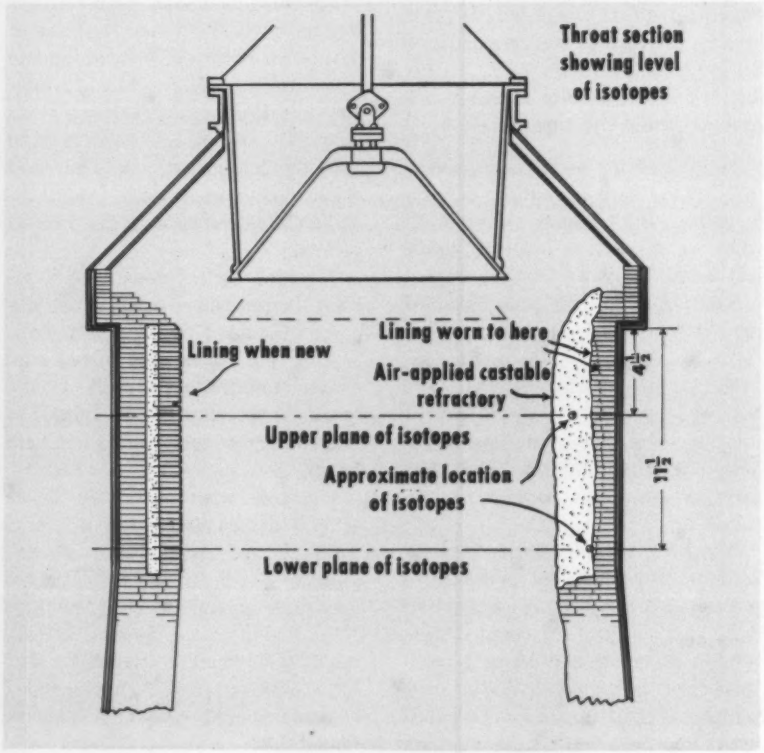
The less expensive materials of Cobalt 60 wire were used. They were sealed in stainless needles as a safeguard against leakage. Cobalt 60 has a half life of 5.27 years which is just about the life expectancy of a furnace lining.

Six locations were selected for the sources. Three were on a plane five feet below the large, opened bell. An equidistant spacing was arranged throughout the furnace. The remaining sources were buried at set locations near the bottom of the original throat armor.

Good Coverage—So situated, the sources maintain fairly complete coverage of the furnace. If the upper isotopes are lost, you know that half of the patch is gone. When the lower sources go, then you know that the whole castable is lost.

About an inch above the upper plane, a step was cut into the still soft refractory. Then a hole was punched to the level of the plane. Workmen used forceps to extract the sources from their shielded con-

Where the Sources Are Placed



Extrude Ingot Into Spiral Shape

Hollow Aluminum Ingots Twist Through Die Riflings

Extruded aluminum shapes are getting larger and more complex.

One company extrudes a rotor with spiralled vanes by using a specially-machined die.

■ The extrusion art is being used to produce large aluminum rotors with integrally spiralled vanes.

Salina Mfg. Co., Salina, Kansas, supplies bulk storage and conveying units to the cereal and other process industries. Its Blendvane feeders use the extruded rotor to blend flour and other granular products into conveying systems.

Large Press—The rotor is extruded on a 13,200-ton press by The Dow Metal Products Co., a division of, The Dow Chemical Co., Midland, Mich. The die and mandrel process is employed using hollow ingots measuring 25-in. OD x 50-in. long, with a 16¼-in. bore. Total weight runs about 1300 lb. Dow uses 6063-F aluminum — a very soft alloy.

The ingots are heated to 800°F in three-stage induction-billet heaters. This takes about 20 minutes. Dow then makes use of the "arrested mandrel." The special tool has a 12-in. diam mandrel tip attached onto a 16-in. diam master mandrel. The master rides within and projects from the bore of the hollow ram. Thus, the press's piercing features are put to good use.

Once inserted through the ingot's bore the mandrel moves forward until its tip extends through the die. The master mandrel is then locked in position relative to the die. As the ram moves forward, it forces the aluminum billet to flow around the fixed mandrel tip, forming the rotor's inside diameter.

Special Die—The most remarkable feature of the process is the exterior spiral. This spiral effect is obtained by machining lead angles into the die lands. The die actually resembles a cross-section of a rifled gun barrel.

The effect is similar in that rifled lands impart a rotating motion to the metal as it leaves the die. The die, mandrel and supporting tools remain fixed during the process.

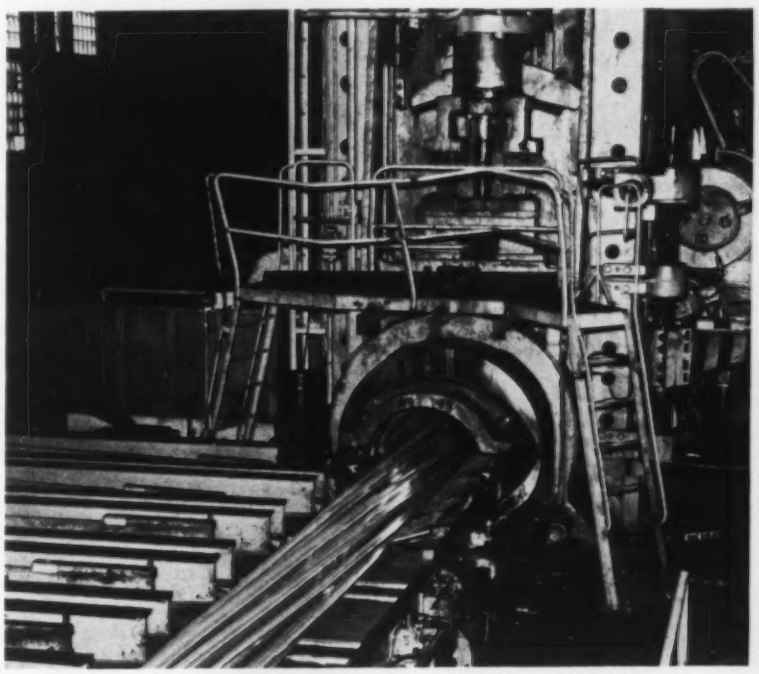
Lubricating the mandrel's surface permits the aluminum section to revolve around the mandrel. The special lubricant also provides a mirror-like finish on the extrusion's inside diameter.

Push-Pull Action—A puller keeps the extruded section under tension. A swivel, designed into the puller's head accommodates the spiral. This action merely permits, but does not create the spiral. The vanes spiral 3/4 in./ft. Thus, the amount of rotation in a 35-ft section is 26¼ in.

The only other operations required after extruding are stretching and cutting. The entire runout length, cropped to 32 ft, is processed on a 1000-ton stretcher. Since 6063-F is a soft alloy, about 200-ton stretching load is used.

The spec for the spiral allows a tolerance of 0.750 ± 0.125 in./ft. The section is usually within tolerance as-extruded. If any correction is needed, it's done by twisting or detwisting the section in the stretcher by employing the contra-rotating action of the units gripper heads.

Rotors formerly were fabricated by welding straight sections of aluminum bar stock to large aluminum tubes. Salina now benefits from shorter lead time, since extruded rotors can be supplied faster than weldments. Also the extruded rotor feeds materials more evenly with its spiralled vanes.



TWISTING FORWARD: The large 1088-lb rotor gets an assist from a swivel-type puller. This keeps tension on the section as it leaves the die.

New Columbium-Treated Steel Stakes Claim On Pipe Lines

Key feature of new pipe steel is the combination of high strength and weldability.

Tests in the field show that it's a potent cost cutter too.

▪ Results of a two-year development program have proved out a new steel for pipe-line construction.

It's a columbium-treated steel, called XC-60, which combines weldability, high strength and cost savings when making large capacity, natural-gas pipe lines. Minimum guaranteed yield strength is 60,000 psi.

Joint Venture—Partners in this $1.5 million development program were: Natural Gas Pipeline Co. of America, Chicago; A. O. Smith Corp., Milwaukee; National Steel Corp.'s Great Lakes Steel division, Detroit.

The program covered design, engineering, metallurgical and cost studies of the new steel from the openhearth through pipe fabrication to service in the field. Pipe sizes studied were 20-in., 24-in., and 30-in. diam.

In Full-Time Service—The acid test was a 47-mile, 20-in. diam pipe line used for actual gas transmission in Texas. It's been in high-capacity service for more than nine months without incident.

GIRTH WELDS: New XC-60 pipe is easily weldable with standard techniques. Welding in cold weather is no problem. No preheating is needed.

For the natural gas industry, this development opens the door to designing greater-capacity pipe lines in anticipation of future demands.

Use of the columbium-treated steel in the 47-mile line resulted in a savings of about $1000 per mile, according to National Steel. Savings are based on established cost patterns for grade X-52 pipe steels (American Petroleum Institute designation), the highest-strength grade now in general use for cross-country pipe lines.

Uses Less Steel—Savings came from: Less required steel tonnage because of the higher strength; lower field welding and material-handling costs; reduced freight costs.

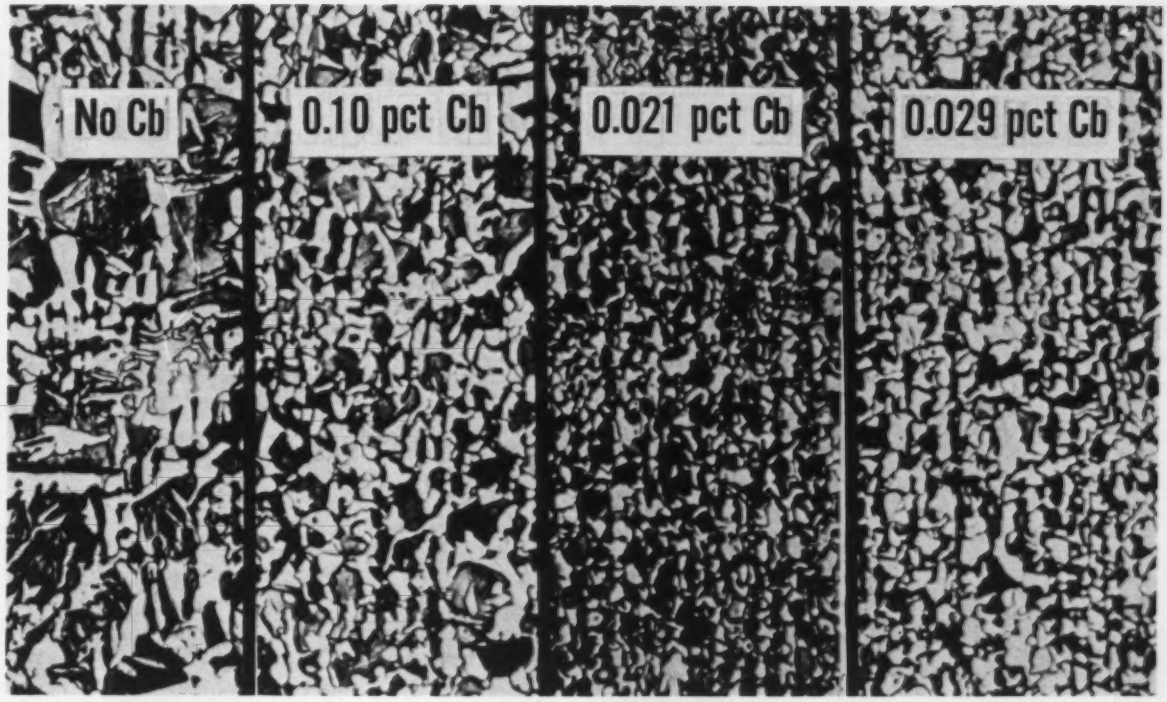
The new pipe steel attains its high strength level, points out National Steel, despite a lower carbon and manganese content than other pipe steels now in general use.

The typical analysis for this columbium-bearing steel is: Carbon —0.26 pct max; manganese—1.30 pct max; columbium—0.05 pct max.

Taking the credit for this achievement is the treatment with columbium. Columbium tends to form a fine grain structure thereby increasing mechanical properties. In the case of XC-60, it gives a minimum yield strength of 60,000 psi.

The new steel is semi-killed. It is similar in chemistry to a group of columbium steels now marketed by National Steel's Great Lakes and Weirton Steel divisions to the automotive and other heavy industries for weight-saving applications.

Saves 770 Tons—The 47-mile pipe line was made of 0.250-in. steel. Obtaining the same strength with the grade X-52 pipe would take a 0.281-in. wall, explains National Steel. This heavier wall thick-



AFFECTS GRAIN SIZE: Treatment of steel with columbium tends to form a finer grain structure. Result: Increase in yield strength to a minimum guaranteed 60,000 psi. Moreover, weldability is not impaired.

ness means about 770 more tons of steel.

Paring pipe needs by 770 tons more than offsets the columbium-steel price margin of $15-20 per ton above steels used for making grade X-52 pipe.

The first chart includes real and extrapolated cost figures when laying different types of pipe. It serves to indicate possible savings with the columbium-treated steel.

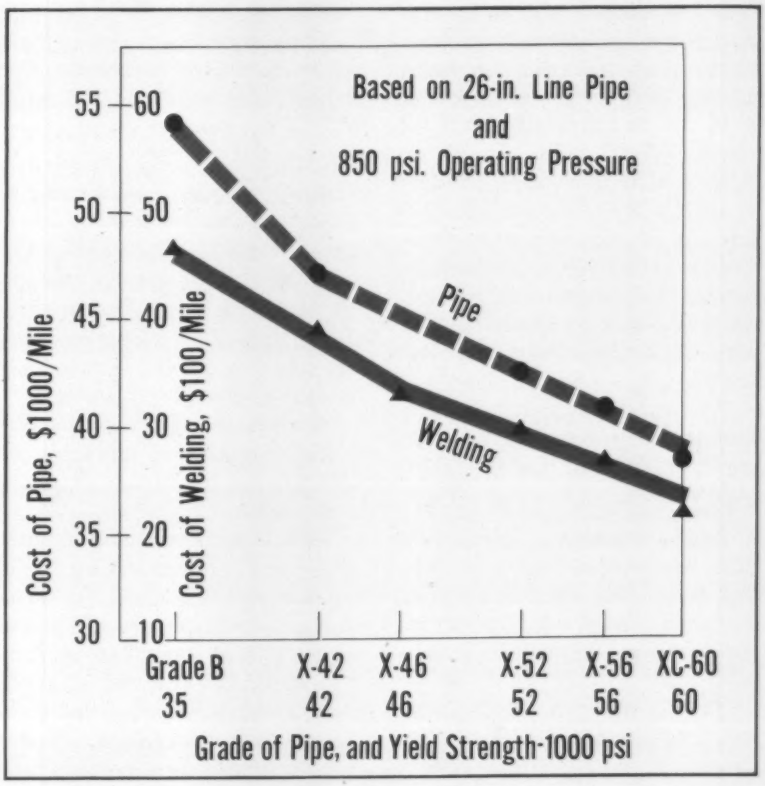
Tests In The Field—An extensive program of field welding testing was made before the material was deemed ready for use.

Among the findings: The XC-60 steel resists underbead cracking. Greater fluidity of the weld puddle is the key to the difference in weldability of XC-60 and X-52 steels.

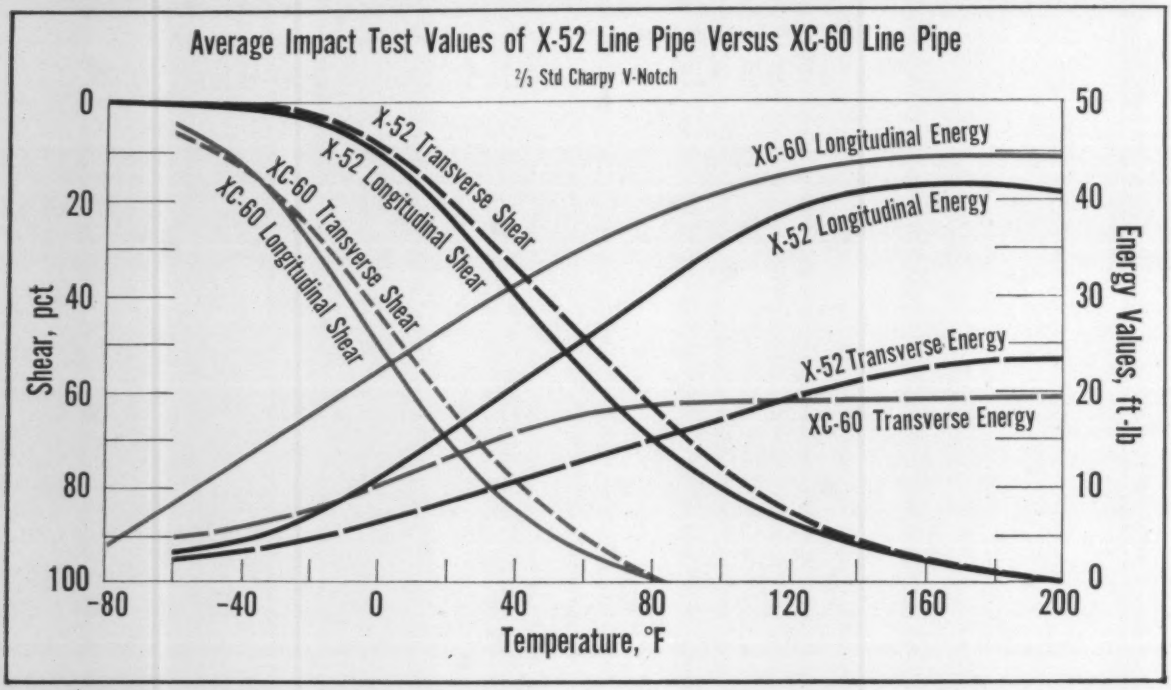
Also noted: Reducing the weld gap for all passes, particularly the root pass, and closing the root gap to about 1/32 in. eliminate internal undercutting and lack of penetration. Result: A good internal bead with an even flow into the parent metal on both sides of the bead.

(Continued over leaf)

How Pipelines Vary In Cost



Columbium Addition Improves Notch Toughness



NOTES PROGESS: Charpy impact tests, made during a two-year development program reveal improved impact properties of new pipe steel, XC-60. Both energy absorption and "percent shear" were used as criteria.

No Weld Cracks — Using this technique, the first 47 mile line of pipe was installed without the loss of a single weld through cracking. Moreover, radiographic inspection of the line's field welds showed them to be completely free of cracks.

As A. G. Barkow, superintendent of inspection for Natural Gas Pipeline Co. of America, says: "This 47-mile installation rates classification as the strongest and probably the freest of weld defects of any natural-gas transmission line ever built."

Prior to its being placed in operation, burst tests found the new pipe steel to have better than 80,000 psi yield strength.

Ductile Fracture — Hydrostatic burst tests were also made on 24-in. and 30-in. diam pipes. In all cases, the burst was of a ductile 100 pct shear fracture. Rupture length averaged 5 ft.

This feature of a ductile, rather than brittle, fracture is expected to cut the chances of "high velocity tears" which have been known to open pipe lines for hundreds of yards, even miles.

Notch toughness is also improved by columbium treatment. The second chart points up the result of Charpy impact tests on grades X-52 and X-60 pipe.

Pares Welding Costs — Girth welding the XC-60 steel pipe cost about $1100 per mile as compared with a $1200 per mile cost pattern for X-52 grade pipe, reports National Steel. This comparison does not take into account field welding in cold weather.

Natural-gas pipe lines are installed outdoors in all kinds of weather. For practical reasons, the work cannot be sheltered.

Cold weather can be a formidable enemy when welding high-strength pipe-line steels. For some steels, it could push welding costs up by $500 or more. Reason: Certain steels, to which such strengthening elements as carbon and manganese have been added, are adversely affected by the faster cooling rates of the cold weather. Because the new pipe steel derives its high strength from columbium, cold weather welding is no problem.

Easy Installation — Another key point is that XC-60 requires no pre-heating. Moreover, it is easily weldable with standard equipment and methods down to −25°F. It's also reported that it takes less weld metal and less weld heat than standard high-strength pipe steels.

In field installation, the XC-60 pipe bent as easily as standard high-strength pipe when following the contours of pipe-line ditches. Bending equipment, however, must compensate for its springback tendency. This requires slightly longer bending pulls.

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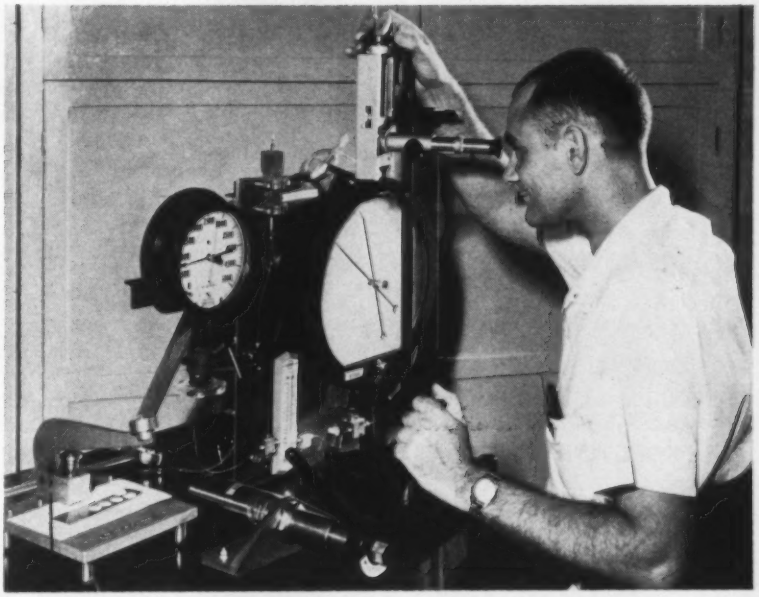
Foil Tester Takes New Approach

NBS Uses Disk-Type Specimens To Find Yield, Ductility

Tensile bars are not on the way out. But a fast, low-cost testing method is making inroads.

A hydraulic bulge tester cups a punched disk to register the materials' yield plus ductility.



PROPERTY PEEK: D. B. Ballard of NBS observes increases in a foil specimen's bulge height. The punch (left) prepares the disks.

▪ Precipitation-hardening stainless steels are widely used, particularly in aircraft. However, the metallurgical reactions which occur during heat treatment of these materials are not fully understood.

The National Bureau of Standards recently drew up a relationship between these reactions and the mechanical properties of the steels. The testing involved would normally be very costly. But NBS made the job much easier and more exacting by using a hydraulic bulge tester to find yield strengths and ductility levels.

Why Use Foil?—Stainless steel foil was used for the study because of its ability to heat and cool rapidly. Moreover, a large number of specimens can be made from a single sheet of foil.

The hydraulic tester was assembled from commercially available high-pressure equipment. To conduct a test, specimens, 0.72 in. in diameter are punched from the heat treated foil. The disks are then mounted in the tester and held in place by a ring and bushing. The ring measures 0.533-in. ID.

Once the disk is mounted, oil pressure is applied to the specimen by a manually-operated pressure cell. The resulting bulge in the unsupported area of the specimen is measured with an optical micrometer. This gage follows the movement of a light-weight indicator which rests on the center of the specimen.

Does the Job—Tests conducted on several heat treated samples showed that the bulge height at failure was an adequate criterion of ductility. The yield strength is determined by the permanent bulge height. This is established by using a series of increasing pressures.

Here's a formula to gage a foil's yield pressure:

$$H^2 = D^2/2000$$

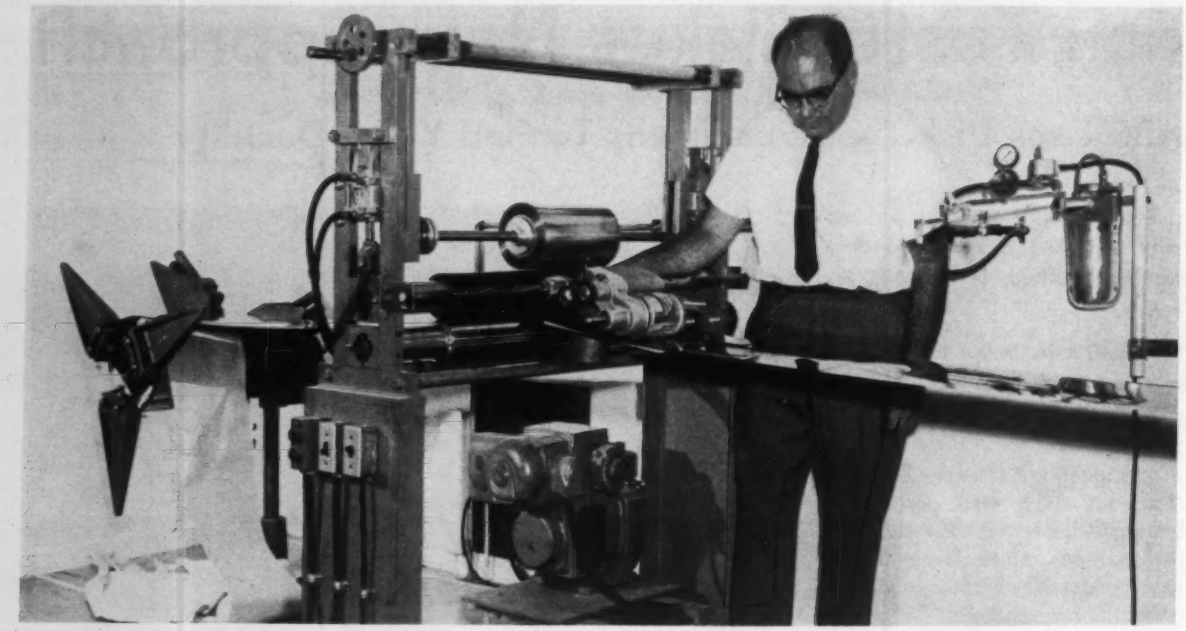
where:

H = permanent bulge height
D = unsupported diameter

The table shows the effect of four different heat treatments on 17-7 PH stainless steel foil. From these results, it appears that bulge tester is capable of picking up the least bit of physical change caused by the various heat treatments.

Bulge Test Offers Quick Data

Heat Treatment	Yield Pressure, psi	Burst Pressure, psi	Max. Bulge Height, in.
Solution annealed	193	2613	0.1556
1400°F - 1½ hr 1050°F - ½ hr	993	2750	0.0751
1400°F - 1½ hr 1050°F - 1½ hr	865	2637	0.1022
1400°F - 1½ hr 1050°F - 6 hr	746	2500	0.1084



ROLL AND STAMP: Roll-on applicator bonds a coded protective film to a polished sheet's surface.

Clear Plastic Protects Metals

Thin Polymer Film Stays in Place During Fabrication

Strong and ductile, a roll-on plastic film prevents marring or scratching of highly-polished metal surfaces.

It's so tough, it even stays in place during stamping, bending and drawing operations.

▪ A breakthrough in the protection of highly-polished metal surfaces centers on a specially-formulated polymer film. This chemically-inert film boasts high abrasion resistance. It serves as a dirt and moisture barrier. And it also retards oxidation.

Called Metal Skin, the newcomer prevents marring and scratching of metal surfaces during fabrication, packaging, shipping and display.

Totally unlike other protective materials, the plastic film was designed to insure complete protection. It guards polished sheet surfaces as they leave a rolling mill.

Staying Power—However, its use doesn't end when the metal undergoes fabrication. The polymer film stays on guard throughout the fabrication process. In fact, it's still on the job when a finished part reaches the consumer.

What about removal problems? There are none. The plastic skin leaves no residue when it's removed. All the user does is peel off the transparent film to obtain a mar-free polished surface. Chemicals aren't needed for film removal.

Where does film use begin? It can be automatically rolled onto polished-steel coils in any in-line operation. All that's needed is a small low-cost interleaving setup.

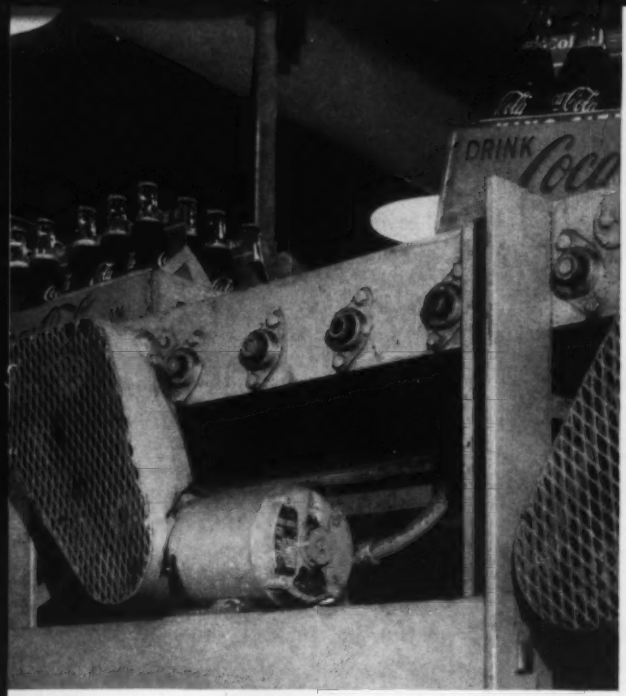
Coding and/or printed messages can be imprinted simultaneously on the guardian film as it's rolled onto the metal. You don't need specially-trained personnel for this work.

Easily Bonded — Various film thicknesses can be applied in any normal room-temperature installation. There are no inherent fire hazards, because the film is non-combustible. Drying ovens and other cumbersome curing equipment aren't required.

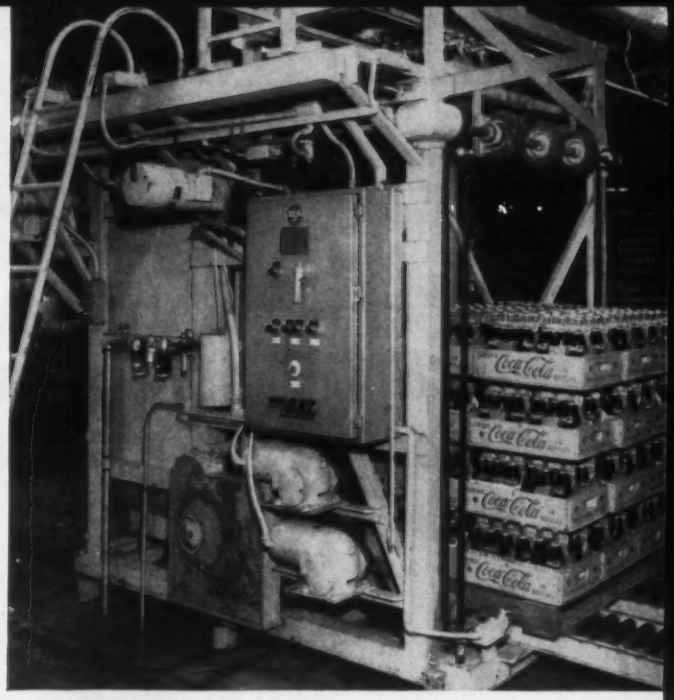
According to its developer, the Metal Skin Corp., Englewood, N. J., the new protective film offers limitless advantages at all levels. It's available in 2500- and 3500-ft rolls.

Since the film is transparent, undistorted inspection is possible at every production stage. The film's excellent flexibility and high abrasion resistance allow protected metals to be formed, bent, drawn and stamped.

Metal Skin remains firmly bonded to the fabricated metal parts until it's removed by the end user. This enhances a product's sales appeal. Grease marks, dirt and scratches become problems of the past.



1 Century's compact IR 48-frame gearmotor driving live roll conveyor to the top of pallet loader.



2 A Century 1R64 SC64 gearmotor with brake (in upper left of picture) raises and lowers pallets from empty pallet conveyor to loaded pallet conveyor.

3 Loaded pallets being picked up by lift truck. Century 1R66 SC66, ¾ horsepower gearmotors drive empty and loaded pallet conveyors.

Century gearmotors load, stack and convey thousands of soft drinks per day

Century Electric's single-reduction, right-angle gearmotors are built right into the versatile pallet loader shown here. Thousands of bottles of soft drinks a day are conveyed, stacked, loaded onto pallets and conveyed to fork lift trucks by Century's gearmotors.

Century gearmotors, with silicon bronze worm gears and hardened high-grade steel worms, are designed and built to withstand sudden shocks and overloads in applications such as this pallet loader. Motor shafts are not affected by operational strains because mounting feet are an integral part of the housing (except the IR 48-frame). Also, motor shafts are carried on ball bearings and output shafts run in tapered roller bearings to withstand sudden shocks.

All-angle oiling design assures complete lubrication. Worms or worm gears dip into oil, no matter how the gearmotors are mounted.

The gearhead on the IR 48-frame gearmotor (Picture No. 1) can be assembled in four different positions in relation to the motor, and the motor can be mounted at any angle. The new 1R 48-frame gearmotor is also very compact. With it you can reduce the weight of your product by as much as 20 pounds.

For more information about Century's complete gearmotor line from ⅛ to 125 horsepower, call your nearest Century Sales Office.

CENTURY ELECTRIC COMPANY

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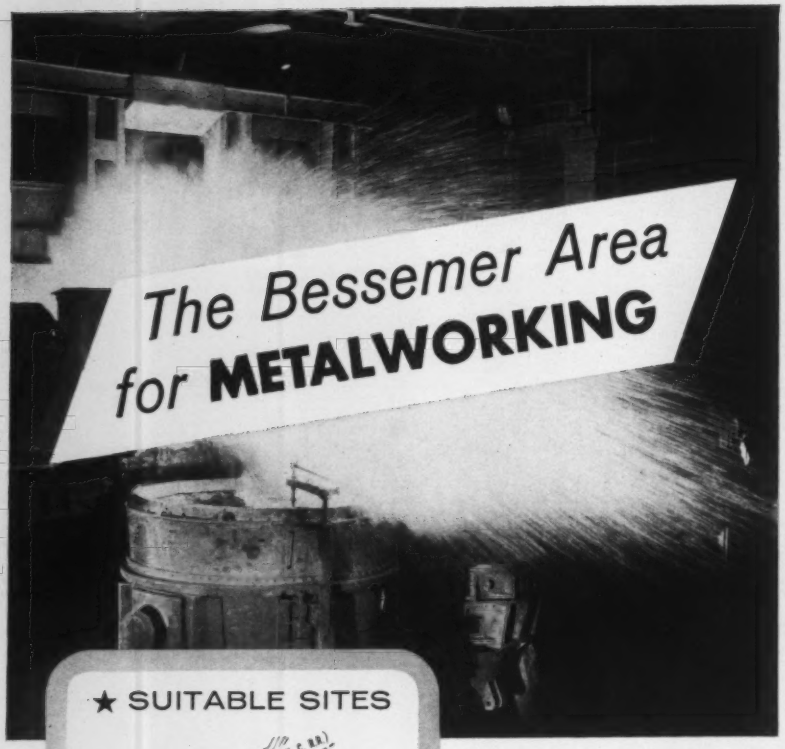
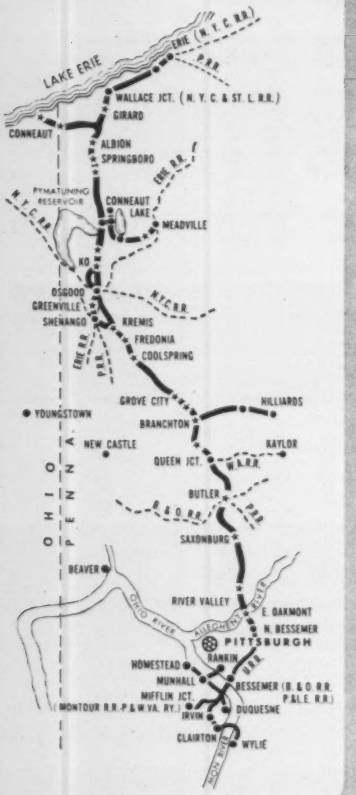


★ SUITABLE SITES



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NEW PATENTS

Forming Ore Lumps

Lumps ores and methods of producing them, L. G. Imperato, Jr. (assigned to Blocked Iron Corp.), Aug. 15, 1961. To produce open-hearth grade masses or lumps of iron ore, admix finely-divided hematite, magnetite, or other iron-oxide ore with (1) high-calcium hydrated lime, dolomitic monhydrated lime, or the like, (2) blackstrap molasses or other water-soluble carbohydrate, and (3) the sodium salt of ethylenediamine tetra-acetic acid. Lumps formed from the mixture react with carbon dioxide in the presence of moisture to produce strong, fluxed masses. U. S. 2,996,372.

Low-Alloy Steel

Low-alloy steel with high hardness at elevated temperatures, A. E. Nehrenberg, T. V. Philip and G. Steven (assigned to Crucible Steel Co. of America), Aug. 15, 1961. This alloy steel achieves maximum as-quenched and tempered hardness, yet is resistant to softening when subjected to long periods of elevated temperatures. It consists of 1-1.25 pct C, 2-6 pct Cr, 1.75-2.25 pct V, 4-7 pct W, 3-5 pct Mo, 0-9 pct Co, and the remainder substantially all Fe. U. S. 2,996,376.

Ore Preparation

Preparation of ores for metallurgical use, A. Subervie, Aug. 8, 1961. In the production of agglomerates of taconite concentrates, blast-furnace dust, or very-fine ores and other metal-bearing materials, ground limestone or coke is dispersed in an inverse emulsion of hydrocarbon oils. This dispersion is mixed with powered pitch and cement. These particles are then sprayed or otherwise coated with the powdered ore or other metalliferous material to form pellets or balls. When sintered, such pellets form a porous bed. U. S. 2,995,438.

Copies of U. S. Patents are available at 25¢ each from Commissioner of Patents, Washington 25, D. C.

New Catalogues And Bulletins

Money-saving products and services are described in the literature briefed here. For your copy, just circle the number on the free postcard.

Easy-Reading Reference

"The Uses and Abuses of Silicone Rubber" serves as text and reference book for the designer. However, it's also an interesting study and guide to this versatile material for even the non-technically oriented. (Mechanical Rubber Products Co.)

For free copy circle No. 1 on postcard

Need a Lift?

An eight-page catalog describes the advantages of spiroid-gear transmission in Porta-Hoist, the first hand-chain hoist to use spiroid gearing. Illustrated in two-colors, the brochure includes specs and dimensions for a complete line of hoists and I-beam trolleys. (Coffing Hoist Div., Duff-Norton Co.)

For free copy circle No. 2 on postcard

Conveyor Breakthrough

Horsepower requirements for belt conveyors have been a controversial subject among materials-handling engineers for the past 50 years. However, a subsidized two-year study by Pennsylvania State University has developed a wealth of new data on this subject. The results are set forth in a valuable 24-page report. (Hewitt-Robins)

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Drive Analysis

"Adjustable-Speed Drives . . . How to Analyze . . . How to Compare . . . How to Select" is the self-explanatory title of a new 31-page booklet. In addition to defining adjustable - speed drives and their role in industry, the new brochure deals in detail with a complete line of these units. (General Electric Co.)

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Retaining Rings

This new catalog contains complete information on an entire retaining-ring line. Dimensional tables, engineering specs and mechanical drawings aid in providing adequate coverage of the subject. (Industrial Retaining Ring Co.)

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Broad Research

Color is the keynote of a technology spectrum which lists areas of research interest and competence at Battelle Memorial Institute. These major areas include biosciences, ceramics, chemical engineering, chemistry, economics, electronics, mechanical engineering, metallurgy, nuclear energy, and physics.

For free copy circle No. 6 on postcard

Catalogs Aluminum

"Alcoa Aluminum Screw Machine Stock," a new handbook published by Aluminum Company of America, is now available. The ring-bound publication replaces two earlier books, updating and combining their contents. According to the company, this manual is the most comprehensive source of information ever compiled on machining aluminum.

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Chemical Guidebook

This new 64-page volume contains a review of all available technical data on the methylamines, including full discussions on shipping, handling, storage, and safety. Specification-test methods for monomethylamine, dime-

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FREE LITERATURE

thylamine, and trimethylamine are set forth in detail. (Commercial Solvents Corp.)
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For Lathe Users

Each of seven basic types of lathe turrets is completely described, illustrated, and dimensioned in an expanded catalog. Its format is designed to help the user analyze his requirements, select the correct turret, adjustable-center or magnetic-base tool, and expedite delivery. (Enco Mfg. Co.)
For free copy circle No. 9 on postcard

Patternmaking Services

This publication outlines the scope of pattern services available to plants that need production advice. Some of the services included are design consultation between pattern shop and foundry, storage of pattern equipment, and model construction. (Alloy Steel Casting Co.)
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About Magnesium

Magnesium — the lightweight metal for low-cost tooling—offers many advantages to both the fabricators and users of jigs and fixtures. At least that's the contention of an attractive booklet which contains a quick review of these characteristics. (The Dow Metal Products Co.)
For free copy circle No. 11 on postcard

Fastener Guide

Captioned "A Guide to Better Fastening," this pocket-size folder propagates detailed information on fasteners for corrugated metal, fiberglass and asbestos. (Atlas Bolt & Screw Co.)
For free copy circle No. 12 on postcard

Field Piping

Sixteen pages in a two-color book tell about the latest and most modern methods for fabricating and field-erecting various types of piping. (National Valve & Mfg. Co.)
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Air Pumps

A new, 16-page, illustrated price list furnishes purchasing agents with the latest prices on a complete line of rotary-vacuum pumps, pressure pumps, gas boosters and accessories. (Lieman Bros., Inc.)
For free copy circle No. 14 on postcard

Brass-Strip Data

In four pages, an illustrated brochure tells all about a special-process brass strip. Cost savings, characteristics, applications and performance of the strip are covered in the literature. (Chase Brass & Copper Co.)
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Pic-A-Pump Catalog

An expanded and now-complete line of centrifugal, axial or mixed-flow pumps is the subject of this attractive offering. Engineering data are conveniently arranged for easy selection of the right pump for a specific use. (Allis-Chalmers Mfg. Co.)
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X-Ray Analysis

A new data folder deals with X-ray methods employed by a large analytical laboratory in handling metals analysis. Illustrations show details of the analytical method. Specific examples are cited in order to compare X-ray and wet-chemistry results. (Phillips Electronic and Pharmaceutical Industries Corp.)
For free copy circle No. 17 on postcard

Electric Furnaces

In addition to the cover carrying a temperature conversion table to 9000°F, a new 44-page catalog includes a general introduction to electric-furnace operation and control. (Thermolyne Corp.)
For free copy circle No. 18 on postcard

Tool-Steel Grade

In a two-page data sheet, a new hot-work tool steel is given top billing. The metal suits applications where drastic coolants such as water are necessary. It will not heat check. (Dodge Steel Co.)
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Lubricant Information

Data on Solnus "C," a general-purpose lubricating oil for extremely-wet conditions, is included in the latest revision of a technical data sheet. Ten viscosity grades of these low-cost oils are described in detail. (Sun Oil Co.)
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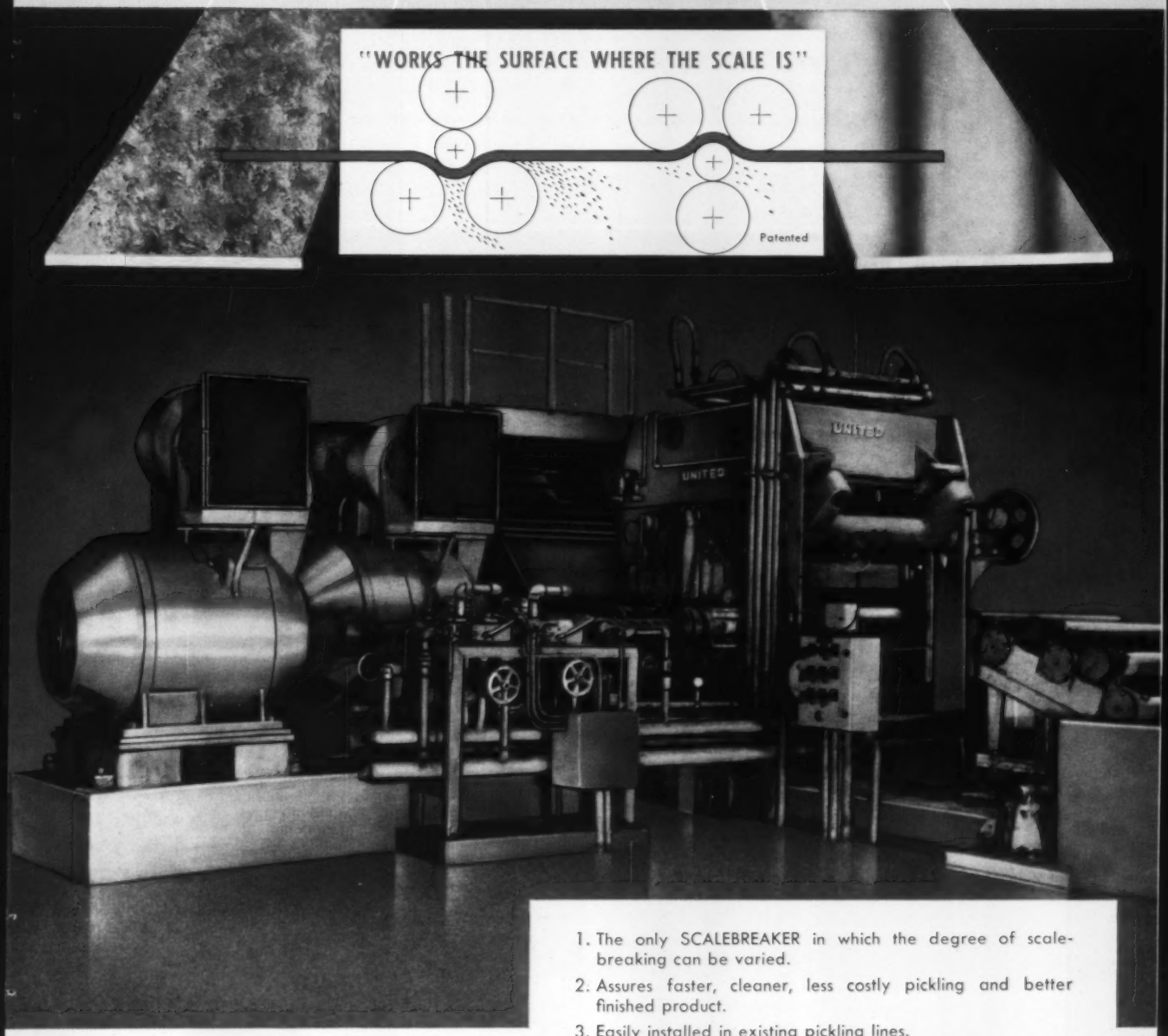

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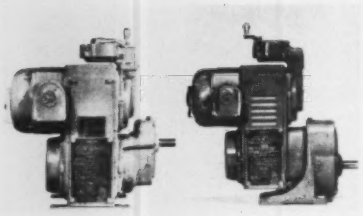
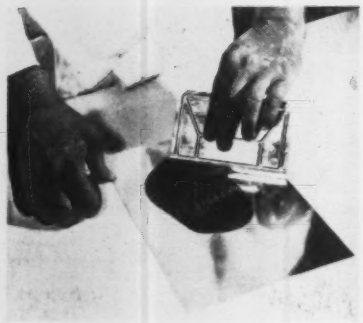
New Materials and Components



Variable-Speed Drives Feature Lub-Free Pulleys

Lubrication-free pulleys stop fret corrosion and pulley wear in a line of versatile variable-speed drives. New single- and double-reduction gear boxes promote smooth operation. In the ¼-hp model with 2:1 speed variation, output speeds range from 10 rpm minimum up to 4660 rpm. Other sizes and speed variations yield similar output ranges. (Sterling Electric Motors, Inc.)

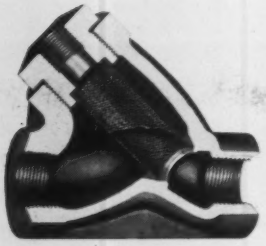
For more data circle No. 25 on postcard, p. 101



Two-part Epoxy Provides Equal-Volume Mixing

The two components in a new epoxy adhesive are mixed in equal parts by volume, instead of the usual odd ratios by weight. It's what one user calls a "foolproof epoxy." Any workman, anywhere, can mix it up and use it without fear of mixing errors. Just as important, the formulation is low in cost and high in strength. There's also a color-signal feature. Part A is cherry red in color. Part B's clear amber. The user mixes the two until color striations disappear, and a uniform tint is achieved. At that point, the adhesive is ready for use. Since it's smoothly free-flowing, application is a simple matter. (Rubber & Asbestos Corp.)

For more data circle No. 26 on postcard, p. 101



Low-Cost Line Strainers Offer High Perfomance

New ductile-iron line strainers are now available as stock items in ¼-3 in. sizes with screwed ends. They're suitable for 600 psi at 650°F, or 1000 psi at 100°F. These units strain steam, water, air, oil, gas or chemicals. Thus, although they're low in cost, performance is more than adequate for most uses. Let's look at some of their features. An accurately-machined body recess and screen cap insure snug screen fit. This prevents any danger of the liquid or gas bypassing the screen. A 30 mesh Monel screen is standard, but others are available. (OPW-Jordan Corp.)

For more data circle No. 27 on postcard, p. 101

Infra-Red Panels Build Do-It-Yourself Ovens

For companies who want to design their own heating equipment, here's a new line of electric infra-red heating panels, elements and engineered oven assemblies. They're available in 22-, 46-, and 70-in. overall lengths with wattage ratings from 500-1500 w for 115-v elements, and 500-3500 w for 230-v elements. Also, special sizes are furnished on request. At normal-line voltage, quartz infra-red elements operate at about 1600°F. Peak emission occurs 3-3.5 microns —the far infra-red range readily absorbed by most materials. With these heating panels, companies in the metals, plastics and chemical industries can construct special-oven assemblies for heating, drying, curing and baking applications. The panels particularly suit installations where very-close control is needed for product heats to 800°F. (Fannon Products Div., Hupp Corp.)

For more data circle No. 28 on postcard, p. 101

Weld Couplet

Weld couplets with a special "weld ring" adapt to any pipe or vessel curvature by simply adjusting the couplets height in the opening when welding. This assures correct positioning and alignment, and a stronger weld without distortion. And there's no weld metal left on the innerface. Carbon-steel couplets come in threaded or socket form. Sizes range from ¼-2 in. (Henry Vogt Machine Co.)

For more data circle No. 29 on postcard, p. 101

Locks at 1400°F

Made of a nickel-base alloy, a high-temperature locknut suits space-age applications. The newcomer mates with the nickel-base family of bolts, and develops high-strength at up to 1400°F. It also has limited application with these bolts up to 1600°F. Principal uses, envisioned for the locknut, are on jet and rocket engines, missiles, gas turbines and other power generation equipment. At room temperature, the units rate at 180,000 psi, minimum tensile strength. At 1200°F, it's 130,000 psi and at 1400°F, 100,000 psi. Typical or average values are somewhat higher. (Standard Pressed Steel Co.)

For more data circle No. 30 on postcard, p. 101

Shaft Oil Seals

With a Teflon-filled sealing element, a new oil seal offers the built-in performance demanded by engineers. The newcomers resist extreme temperatures, and are chemically inert. Corrosion doesn't affect them. Here are some construction features: Steel case which encloses all component parts, special gasket to hold the sealing element in place and a Teflon sealing element riding firmly against the shaft. The seals will not score the shafts on which they are used. (Garlock, Inc.)

For more data circle No. 31 on postcard, p. 101

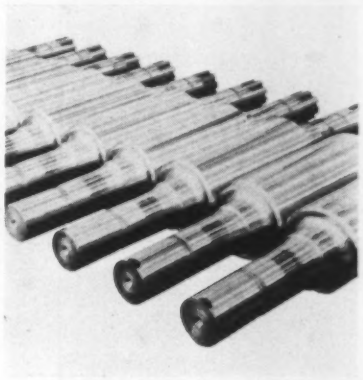
One-Pole Thermostats

New, bi-metal thermostats act as a thermal safety switch. The units are well suited for use in hot trays, warmers and in the control of forced hot air. Each thermostat has single-pole, single-wire controls. These contacts open with a rise in temperature. The operating range is from 70°-600°F. (American Thermostat Corp.)

For more data circle No. 32 on postcard, p. 101

Cold-Reduction Rolls

New tool-steel reduction rolls are available to meet exacting specifications. These rolls are formed from steel forgings which have been vacuum processed to remove deleterious gasses. Vacuum processing



improves electric-furnace steel by removing up to 99 pct of the hydrogen content. (The Tool Steel Gear & Pinion Co.)

For more data circle No. 33 on postcard, p. 101

Precision Spheres

Precision balls of special materials are now available in both prototype and production quantities. Among the newer materials are Boron carbide, titanium diboride, glass-filled Teflon, Indox I, ferrites, synthetic rubies, tantalum, titanium carbide and high-density aluminum

THE FREEDOM DIMENSION

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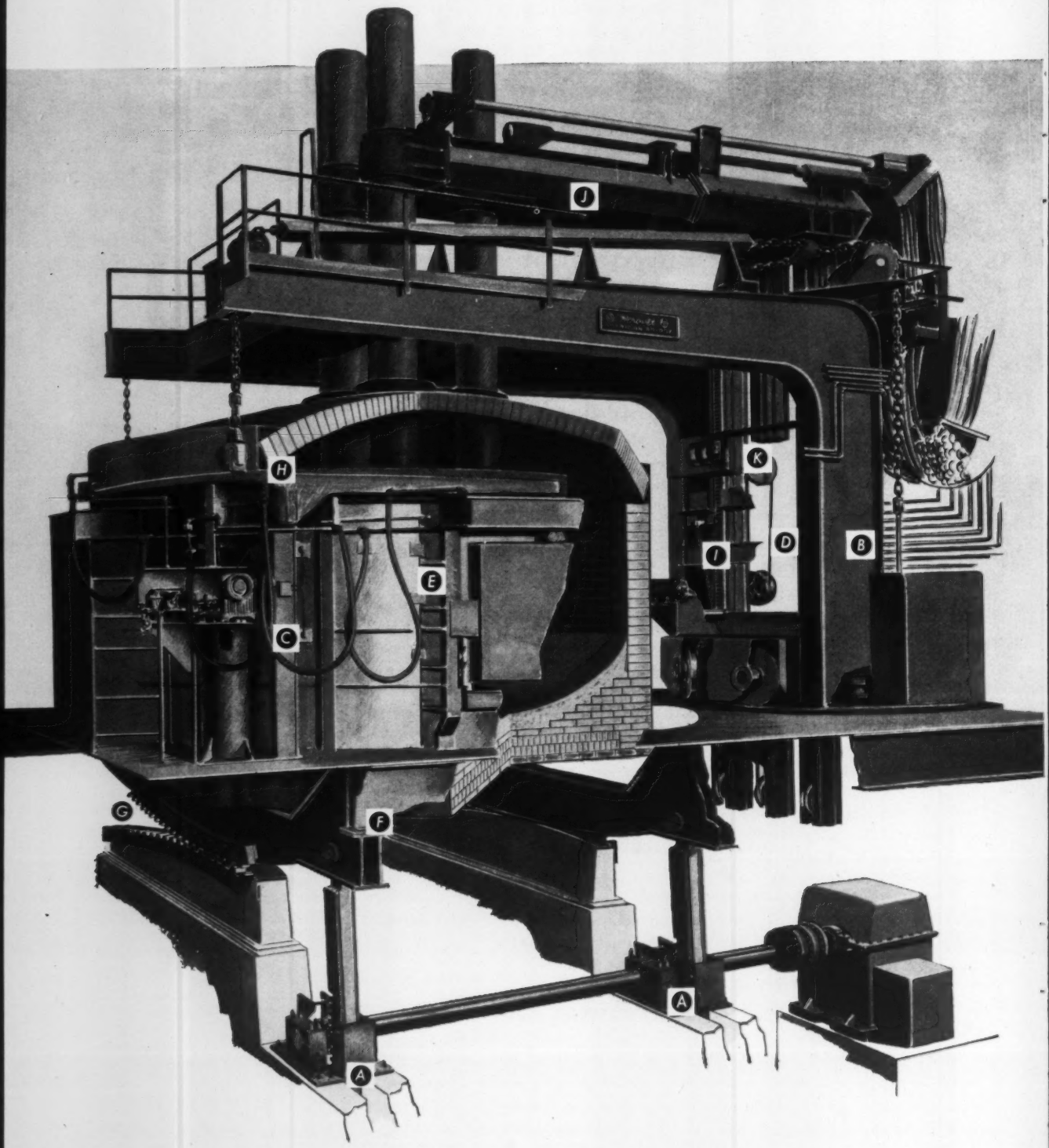

This mark tells you a product is made of modern, dependable Steel.

with a Heroult Electric Furnace

You can increase your steelmaking efficiency and get better steel in the bargain with a Heroult Electric Arc Furnace. Here's why: Heroult Furnaces heat fast — make more melts per day. Heroult Furnaces lower costs through high yields per heat and small scrap losses in charging. And, Heroult Furnaces improve steel quality by reducing sulfur and phosphorous content.

If you're looking for performance, efficiency, economy and low-cost maintenance, consider these features:

1. Heroult Furnaces are 100% mechanically operated. Including **(A)** heavy rack-and-pinion-type tilting mechanism, **(B)** motor-driven, rotating, jib-type roof swing, **(C)** winch-operated, water-cooled, jib-type door-lift mechanism, and **(D)** high-speed, electro-mechanical electrode-positioning mechanism.

2. Cage-type shell construction with shell plates loosely attached **(E)** to heavy supporting structure. This construction minimizes shell warping and allows easy replacement of damaged shell plates.

3. Operating mechanism independently supported. The tilting platform on which all operating mechanisms are supported is attached directly to the rockers independent of the shell structure **(F)**. Thus, operating mechanisms are unaffected by shell distortion.

4. Water-cooled, Skew Back Roof ring. This feature **(H)** eliminates the need for special skew-shaped roof refractories.

5. Electrode Mast Safety Device. This spring-loaded, rack-and-pawl-type device **(I)** provides positive protection against damage resulting from electrode winch cable breakage.

6. Square-section, Water-Cooled Electrode Mast Arms. This design **(J)** guarantees a rigid connection between mast and mast arm, thus helping to maintain proper electrode position.

7. Remote-Controlled Electrode Clamps. This device, of the spring-clamp, air-release type, is located inside of the rear section of the water-cooled mast arm where heat cannot affect it.

8. Square-Sectioned Electrode Mast. This design feature **(K)** developed by American Bridge, assures proper guiding and electrode positioning.

9. Rockers. The heavy fabricated steel curved top and bottom rockers **(G)** minimize forward travel during tilting. These rockers are designed so that the furnace will tend to return to horizontal position from any degree of tilt.

American Bridge constructs Heroult Furnaces for all types of arc melting, in charge capacities from 6,000 lbs. to 400,000 lbs. with shell sizes ranging from seven feet up. They are equipped with roof-removing mechanism for fast top charging. They can be furnished with a non-magnetic shell bottom section to accommodate induction-stirring equipment. Gantry-type top-charge furnaces, door-charge furnaces and special furnaces for duplexing and non-ferrous melting are also available. Your crew can easily maintain a Heroult Furnace. Check American Bridge's complete design, construction and installation service.

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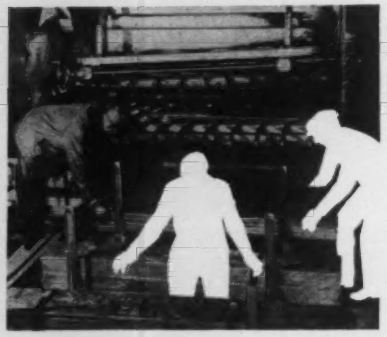
American Bridge Division of United States Steel

USS

USING FRIED EQUIPMENT



1 man does the work of 3!

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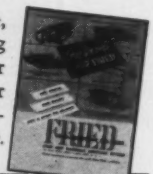
A. R. PURDY CO., metal warehouse, found their operator, working with 2 back-of-shear assistants, could not keep pace with their shear's 60-strokes-a-minute output. Then they installed a FRIED Liftveyor and Stripveyor...

"Production increased to the shear maximum," says a Purdy official. "Equally important, the cost of 2 helpers on each of 3 shears was eliminated!"

Other advantages of the FRIED Liftveyor:

1. Pneumatically operated plungers support all types of metals, all sheet and plate widths, against flexing.
2. Shearing is kept accurate to within .005".
3. Downtime caused by accumulations behind the shear is eliminated.
4. Injuries from sharp-edged cuttings, burrs, falling trim pieces and the like are prevented.

Discover how FRIED plate, sheet and strip handling equipment can help your production and cut your operating costs. For free illustrated catalog, *act now.*



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DESIGN DIGEST

oxides. Balls of these materials have great possibilities in cases where temperature and load extremes are severe. They also suit applications requiring corrosion resistance, magnetic or non-magnetic qualities, dielectric properties of controlled density. For research and development purposes, the high-purity metal spheres come in a wide range of sizes and tolerances. (Industrial Tectonics, Inc.)

For more data circle No. 34 on postcard, p. 101

Automatic Clutch

Featuring built-in, forced-draft ventilation for cooler operation, a new automatic clutch suits gasoline and diesel engines from 6-10 hp. For new applications, or for modification of existing installations, there is a wide range of models. These include standard sizes of single- and double-groove sheaves, chain sprockets, timing-belt pulleys and direct-coupling clutches. Other features? Load-free idling, smooth application and release of load by throttle control only, protection against engine damage or stalling from sudden overloads. (Salsbury Corp.)

For more data circle No. 35 on postcard, p. 101

Precision Shaft Locks

An improved series of precision shaft locks is ready for immediate delivery. They're for use on potentiometers, capacitors, coils and other shaft-type controls. Stocked in two styles, knurled hand nut or wrench hex nut, these collet-type locks fit ⅛- and ¼-in. shafts. You have your choice of passivated-stainless steel or black-anodized aluminum. (PIC Design Corp.)

For more data circle No. 36 on postcard, p. 101

Larger Frames

A new line of ac motors and generators feature larger frames for faster response and lower vibration. The ribbed construction at the frame base gives self-supporting, pre-aligned rigidity. Moreover, the use of brackets and ballbearings reduces weight and the required floor space. Typical motor ratings are 500 hp at 850 rpm from 240-v ac. Corresponding generator ratings are 480 kw at 850 rpm from a 250-v dc power supply. (Westinghouse Electric Corp.)

For more data circle No. 37 on postcard, p. 101

Welding Regulator

Without other heat sources, an air-heated regulator avoids freeze-up of flow-control equipment in metal-arc welding. This is done by expanding the carbon dioxide gas through two stages of pressure reduction. The unit has a preset, one-stage regulator, a heat-exchange coil, a second stage of pressure reduction and a float-type flowmeter. This flowmeter regulator is good for most jobs where the flow and duty cycles are under 80 feet per hour. (Air Reduction Co.)

For more data circle No. 38 on postcard, p. 101

Valve Checks Backflow

This safety-check valve stops dangerous contamination of oxygen regulators by toxic fuel gas. The newcomers can be used on torches with low pressures of less than 1 lb acetylene or 3 oz of natural gas. They also operate with all commercial gases. Regulator models replace the outlet nipple and fit all makes of line and cylinder regulators. Torch models are screwed onto the hose connections of the torches. Then these hoses are attached to the check valves. (The Wellman Co.)

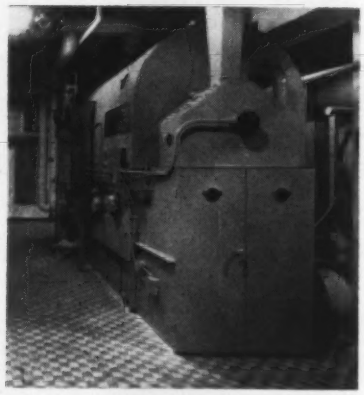
For more data circle No. 39 on postcard, p. 101

Tubing Valves

Stainless-steel tubing valves suit extreme-temperature service. An elongated stuffing box removes the packing from the hot zone in the valve body itself. The unit gives good service with gas or liquid at temperatures up to 1000°F, and pressures to 30,000 psi. Its stem doesn't rotate against the seat. (Autoclave Engineers, Inc.)

For more data circle No. 40 on postcard, p. 101

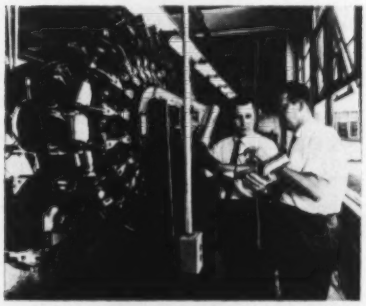
New Equipment and Machinery

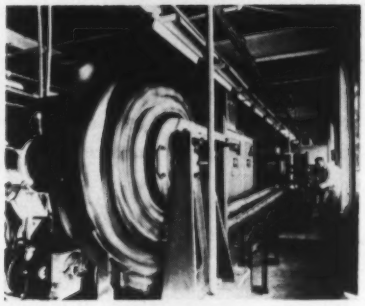


Automatic Heating System: New Chance for Coal?

After three years of development, a "packaged" coal-fired boiler is now available for industrial and commercial use. The unit combines boiler, stoker, combustion-control regulators, coal conveyor and ash conveyor into one automatic system. Here's how it operates. At the suggestion of a bin-level control, coal is picked up and transferred to a storage hopper at the front of the boiler. It stays there until controls attached to the steam or hot water lines signal the stoker to feed more fuel. When boiler needs are met, the electronic controls say, "Enough." The equipment slows down and then stands by until more fuel is needed. Also of interest is the fact that combined with a convertor, the system serves as an air-conditioning unit in the summer. (Canton Stoker Corp.)

For more data circle No. 41 on postcard, p. 101





Advanced Machine Steps Up Production of Cans

Described by the manufacturer as "the first major advance in can-making machines in over 25 years," this versatile machine turns out cans from aluminum, standard tin plate, double-reduced tin plate, and "tinless" steel plate at speeds of up to 2000 cans per minute. Maximum speeds on conventional machines seldom exceed 600 per minute. Key to this performance is an entirely new principle. Conventionally, cans are made from individual "body blanks"—blanks of tin plate cut to the size of a single can body. These are automatically fed into a machine that notches, forms, solders and presses them. Instead of using this reciprocating principle, the new machine turns out cans from a coiled metal sheet. First, it forms a continuous ribbon of the metal sheet into a tube. Then it welds the seam, and automatically cuts the tube into cans of proper size. This latter operation is performed by a giant "ferris wheel," which disgorges cans three times faster than conventional machines. Three years ago, when plans for the new machine were first submitted, it was decided that the new theory of canmaking was economically unfeasible. Since that time, new materials such as aluminum have forced a reappraisal. Today, a machine that handles both tin plate and aluminum in volume quantities is an economic breakthrough. (American Can Co.)

For more data circle No. 42 on postcard, p. 101

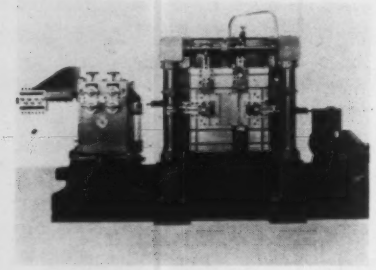
Recorder Monitors Up to 40 Production Units

Desk-top size notwithstanding, this new device monitors and records the status of up to 40 production or data-processing machines. Known as the Bar Chart Recorder, this unit operates away from production areas to provide cost- and production-control data on a continuous bar chart. This readout places at management's fingertips an accurate graphic picture of each machine's productive and nonproductive effort. Every 20 seconds, the recorder samples and records performance. If a machine is operating, that fact is registered with a short horizontal line in the appropriate area on the chart. Lines do not appear if the machine is idle. Basic recorder units are a rotating drum, a stylus and an inkless chart. Wires connect to each machine. (Electronic Associates, Inc.)

For more data circle No. 43 on postcard, p. 101

Forms Wire and Strip

Recently developed is a metal-processing machine that forms long wire and strip parts at speeds as high as 120 parts per minute, in feed lengths up to 24 in. Modular

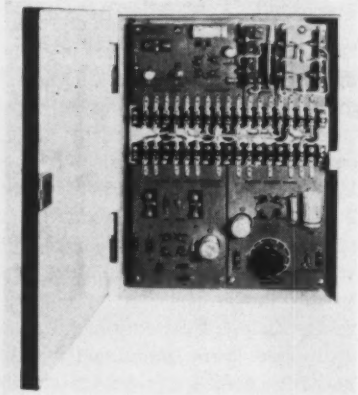


design of feed, press and forming units provides unusual flexibility to produce a wide range of precise metal shapes and forms. As many as eight interchangeable forming-slide units may be mounted at desired position in the T-slots which are provided at the top, bottom and sides of the large-tooling plate. Maximum-wire diameter is 0.250 in. for limited bends; 0.207 in. for unlimited bending. Maximum-strip width is ¾ in. (Torrington Mfg. Co.)

For more data circle No. 44 on postcard, p. 101

Magnetic Amplifier

Newly-developed is a proportional-power magnetic amplifier for precise electrical-control applications. Coupled with a saturable-core reactor, the new amplifier is the electrical equivalent of an equal-percentage valve. In other words, a linear change in the system will produce a percentage change in process power. Among other uses, this system controls the temperature of an electric furnace with a high degree of accuracy. In an industrial gas-melting operation, for example, the unit was subjected to

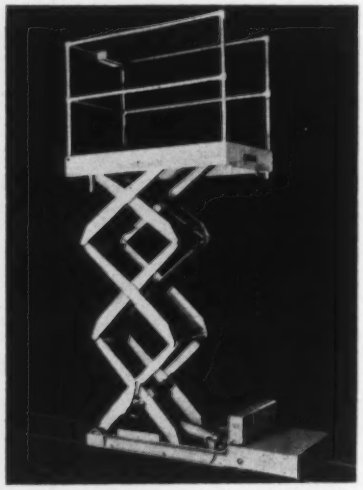


exacting tests over a period of about one year. Temperatures were reliably held to within 0.1° at 1400° C. (Hevi-Duty Electric Co.)

For more data circle No. 45 on postcard, p. 101

How About a Lift?

This triple-scissor personnel lift is the newest in a series of job-designed lift tables. With an extended height of 8 ft, the unit brings articles on racks or shelves 14-ft high well within the reach of an average-size operator. For operating ease, a pushbutton console on the handrail controls both ascent, descent and lateral travel. Since there's no superstructure to impede his movements, the operator can work both sides of the aisle with equal ease, speed and safety. Minimum platform width of 24 in. permits use in the narrowest of aisles.



Tasks such as order picking, parts storage, or tool and fixture selection are naturals for the new lift. (Southworth Machine Co.)

For more data circle No. 46 on postcard, p. 101

Feeds 4-in. Parts

Powered by an electromagnetic-drive unit, a new vibratory-parts feeder handles parts up to 4-in. length. It feeds them into a 24-in. cast-aluminum bowl. This unit's rigidly-constructed base contains the electromagnetic drive which operates at 3600 vibrations per second. A separately-equipped rheostat control changes the ac current to a vibrating dc current which

powers the drive. In operation, electromagnetic vibrations move the parts up and around a spirally-inclined track that's built around

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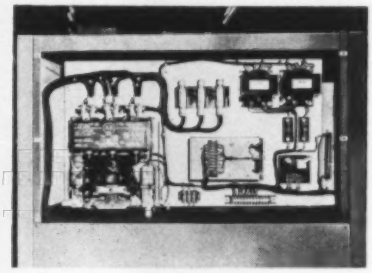
the inside perimeter of the bowl. Parts discharge from the spiral track at a predetermined rate. A turn of the rheostat control increases or decreases this feed rate. (Elk Engineering Works)

For more data circle No. 47 on postcard, p. 101

Control Rectifiers

Here's a completely-new line of automatically-controlled silicon rectifiers for high-current, low-voltage applications such as anodizing and plating, electrochemical uses, and electrochemical machining. Power ranges are from 1000-10,000 amp with 6-100 v. Main feature of the line is a transistorized control package. It includes the silicon-controlled rectifier that provides either automatic current or voltage stabilization. This means complete, automatic control of the rectifier output for any possible use. Depending on the application, control can be made proportional to line speed temperature, and many other production variables. (Hanson-Van Winkle-Munning Co.)



For more data circle No. 48 on postcard, p. 101

Material Tote-Tank

Designed for use in factories, and for shipping, this new material-handling unit can transport either liquid or bulk materials. Because of its unusual design, it can be used to carry all kinds of heavy and lightweight materials. Here are just a few examples: Bulk or liquids, raw materials such as chemical or sand, manufactured components, finished goods and scrap. Major feature of the carriers is a 10-gage, electrically-welded steel tank which is long, narrow and deep enough to hold a large capacity. At the same time, this configuration takes up less space in factory aisles and alongside machines. (The Lull Engineering Co.)

For more data circle No. 49 on postcard, p. 101

Isostatic Pressing

This new isostatic-pressing system attains high-density uniform compaction of irregularly-shaped powdered metal or ceramic-parts, by hydraulic pressure. These com-

The Beauty and the Brute
In Perforated Materials

Perforated materials today play a key part in providing both structural strength and clean-cut eye appeal in almost every phase of industry.

From jet engine screens to paper making machinery . . . from air conditioning to food processing equipment . . . from machine guards to architectural panels . . . from seating to mining equipment . . . you'll find the beauty and brute strength of perforations.

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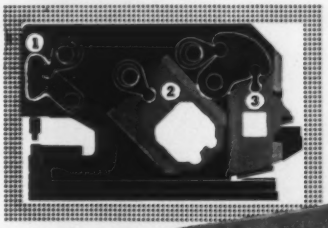
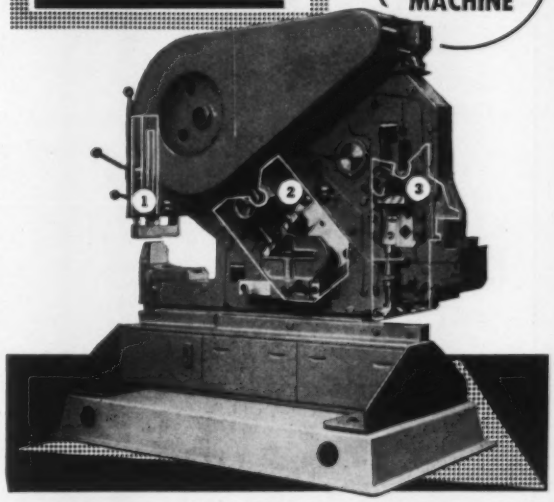


3 CLUTCH MACHINE



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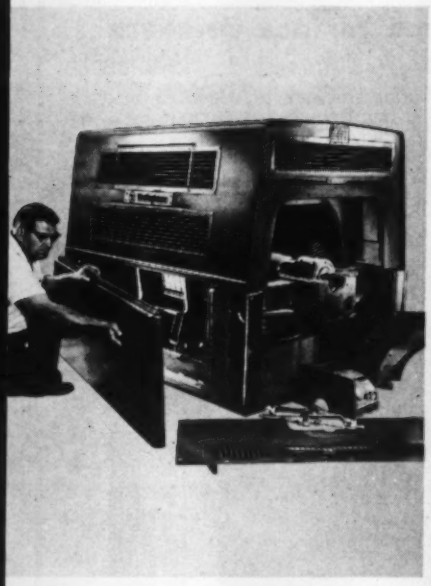
Westinghouse F/A motor completely disassembled in 90 minutes

Only 90 minutes are required to completely disassemble the Westinghouse F/A (fully accessible) motor. After cleaning, inspecting and servicing, the F/A motor can be completely reassembled and returned to service in about two hours. One maintenance engineer reports that an F/A motor is serviced in his shop in about one-fourth the normal time for comparably rated motors. F/A motors are available in ratings from 250 hp/600 rpm to 7000 hp/3600 rpm. For more information, call your Westinghouse representative. Or, write Westinghouse Electric Corporation, P.O. Box 868, Pittsburgh 30, Pennsylvania. *You can be sure . . . if it's Westinghouse.*

Motor stopped; disassembly begun.

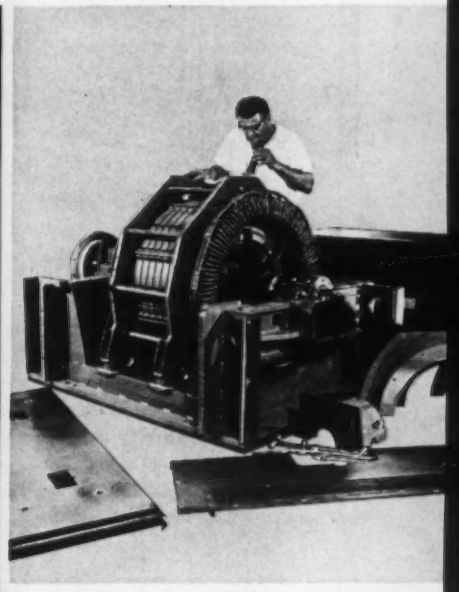
9:20

Sufficiently disassembled to permit bearing inspection.



End covers, side panels, air shields removed. Winding inspection now possible.

10:32



Complete disassembly possible for major cleaning, inspection and servicing.

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...and reassembled in just two hours

Quality plus economy when you buy SUMITOMO steel wire rods

Rapid developments in the wire-product field have increased industry's demand for top-quality steel wire rods. Because of its international reputation for reliability, Sumitomo Metal supplies world markets—America in particular—with 7,000 tons of wire rods every month. To keep up with this export demand, Sumitomo Metal has added to its present facilities another new wire rod mill, completely equipped with the most modern machinery available.

Dimensions of Sumitomo Wire Rods	
Diameter	5mm. (13/64″)—16mm. (5/8″)
Weight	Single Bundle about 270 kgs.—320 kgs. 600 lbs.—700 lbs. Compressed Bundle (6 coils) about 1,620 kgs.—1,920 kgs. 3,600 lbs.—4,200 lbs.
Coil Dimensions on Request	

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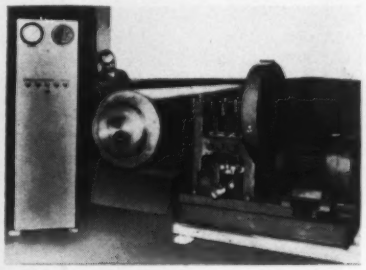
NEW EQUIPMENT

plete package units include pumping equipment, compression cylinder, pressure vessel, valving and



instrumentation. Designs cover either manual or automatic operation. Capacities range from small research-size units on up to large production systems. (Autoclave Engineers, Inc.)

For more data circle No. 50 on postcard, p. 101

Hand Surface Grinders

Designed to meet the needs of toolrooms, diemakers, school shops, repair shops etc., both models of a new hand surface grinder supply precision grinding at low cost. The smaller unit, 6 x 12-in., has cross-

feed graduations in increments of 0.001 in.; while the larger 10 x 16-in. model offers increments as small as 0.0005 in. Work-height capacity, under a full-size grinding wheel, is 12 in. on both models. Both are capable of heavy, sustained usage. Heavy-ribbed construction of vital parts prevents distortion under load. It also curbs any tendency of the wheel to "cock" under heavy feed. (Norton Co.)

For more data circle No. 51 on postcard, p. 101

Heat Mounts on Steel Prices

President's personal appeal, break in aluminum ingot price, combine to put more pressure against possible steel price increases.

On the general market, auto labor trouble plagues order books.

■ Pressures against steel prices mount on the basis of White House and competitive moves.

First is the personal approach by President John F. Kennedy. He invited U. S. Steel chairman Roger M. Blough to the White House last Thursday. There, he outlined his position, and reasons for it, in opposing steel price increases at this time.

This personal touch followed the President's previous letters in which he asked 12 major steel companies not to increase steel prices after the wage increase Oct. 1. In their replies, none of the companies promised not to raise prices. Most commented on adverse earnings and other market factors.

More Determined—The effect of the President's private discussion with Mr. Blough can not be immediately assessed. But it shows that President Kennedy is determined to follow through and exert probably even further pressures against steel price increases.

Of equal importance is the cut in ingot prices by U. S. aluminum producers. The competitive situation between steel and aluminum has never been stronger and the aluminum cut of ingot prices (from 26¢ per lb to 24¢) adds to the pressure on steel prices. Although aluminum mill products were unchanged, the ingot price has a definite relationship to steel prices and its reduction will be felt.

Added to all this, the steel market, although firming up steadily, may not be strong enough to sustain a price increase across the board with or without outside pressures.

Automotive Confused — In the general market, the confused situation in auto labor continues to throw the steel market off balance. For example, September is not likely now to exceed the June level by much as auto production will lag possibly 200,000 behind the goal of over 500,000 for the month. September production of steel has held up, but at the expense of building inventory at the mills.

Some sidelights worth mentioning: Automakers have not come in with expected orders for galvanized steel. Nevertheless, galvanizing facilities are going at full capacity. When automakers come in at full strength, a galvanized shortage may well develop over night.

More Coming—Ford, in an effort to rush production while GM wrestled with labor problems, has been scrambling for steel in a real rush. However, Ford now faces the possibility of labor shutdowns.

The auto situation tends to obscure the general advances and lengthening of delivery on many products through many areas of the country. Mills now look to an improved October and orders now coming in for November are encouraging.

District Steel Production Indexes 1957-59=100

	Last Week	Two Weeks Ago	Month Ago	Year Ago
North East Coast	118	114	116	91
Buffalo	99	103	93	86
Pittsburgh	106	101	97	63
Youngstown	100	97	96	81
Cleveland	142	134	119	93
Detroit	148	143	134	104
Chicago	116	111	109	92
Cincinnati	124	113	114	81
St. Louis	89	93	125	97
Southern	101	89	111	71
Western	114	112	117	86
U. S. Index	113.5	109.1	108.4	83.0

Source: American Iron & Steel Institute

Steel Production, Composite Prices

Production	Last Week	Two Weeks Ago	To Date 1961	To Date 1960
(Net tons, 000 Omitted)	2,114	2,032	68,318	78,243
Ingot Index				
(1957-59=100)	113.5	109.1	96.5	110.5
Composite Prices	This Week	Week Ago	Month Ago	Year Ago
Finished Steel base (Cents per lb)	6.196	6.196	6.196	6.196
Pig Iron (Gross ton)	$66.44	$66.44	$66.44	$66.41
Scrap No. 1 hvy (Gross ton)	$39.50	$39.50	$38.50	$31.50
No. 2 bundles	$26.83	$26.50	$25.17	$21.17

Foundries Push Modernization

Purchasing agents who buy castings will gain from a new foundry modernization drive.

With recent sales advances after some slow years, foundries are loosening the capital equipment purse strings again.

▪ Foundrymen are on the verge of another modernization drive in the struggle to stay competitive. And purchasing agents who buy castings stand to benefit from the improved product.

A modest improvement in castings shipments has developed after several slow years. Foundrymen now are loosening the purse strings to overhaul shops where they can.

More Inquiries—"We have had a considerable number of inquiries, which gives us hope for a good upswing in 1962," says John J. Watson, Foundry Engineering Div. manager of Barlett and Snow Pacific of Cleveland, a leading foundry equipment builder.

"Until just lately, most foundry men have been repairing and refurbishing existing equipment, and making it do. Now they are thinking in terms of new capital equipment because they must either modernize or get out of business. Some of the plans have been approved. But the money is still not appropriated. Increase has been across-the-board, rather than from any single type of foundry. If most of the inquiries materialize into orders, our sales could be two or three times the level we bottomed out at in 1958."

Higher Level—Reports of incoming orders at the Foundry Equipment Manufacturers Assn. indicate a continued seasonal low through July because of foundry vacations and auto labor uncertainty. But a strong fourth quarter should bring the order level to the best since 1959.

Einar A. Borch, president of the Assn. and executive vice president of the National Metal Abrasive Co. of Cleveland, feels that the second half recovery has been delayed by the normal summer lull, the auto changeover period and labor uncertainty, and postponement of action on depreciation reform.

Reports for August not yet in are expected to intensify the modest upward trend which started in the first quarter this year. On a 1947-49 index basis, orders last year were 119, compared with 143 in 1959 and a recent low of 89 in 1958.

With a strong fourth quarter, orders this year could reach 125 or better.

Top Categories—Hottest items of new foundry equipment ordering are furnaces and accessories. Orders are coming in at a rate well over the 1960 level for this category, which wasn't strong then. So the new ordering is a delayed demand.

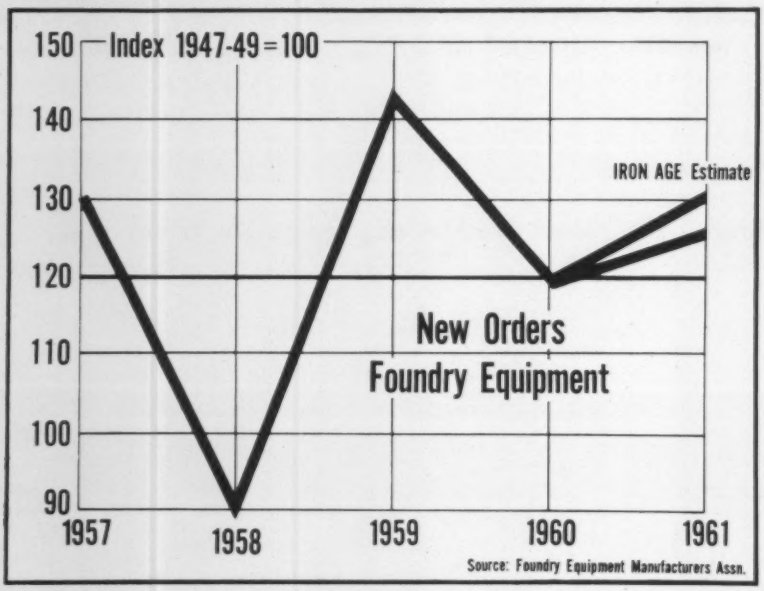
Much of the equipment is apparently going for replacements in modernizing programs.

Other categories which have had a lesser drop, but also are showing less action now, are equipment for blast cleaning and tumbling, dust and fume control, molding machines and materials handling.

Doubled Sales—One leading cupola builder—Modern Equipment Co. of Port Washington, Wis., expects its sales from July this year to the same month next year will double.

"After World War II, foundries needed capacity. And a good deal of obsolete equipment could be used to get it," says Fred Mueller, president. "Now the accent is on getting out a better product, rebuilding and replacing equipment to do it. Thus there is not too much activity in regular expansion, although in many cases an expanded capacity goes with the modernization."

Foundry Equipment Rebounds



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Sheet Stepup Leads Delivery Advance

Despite the unsettled auto production situation, sheet mill delivery promises are moving up a week.

Shipping estimates are also extending in heavy plate, structurals and bar.

■ Most steel users are sure they'll continue to get fast delivery. But mill delivery times are still moving out.

Following a trend begun several months ago, shipping estimates keep lengthening.

The latest IRON AGE survey (see table below) shows a week's longer delivery on sheet, plate, and shapes in many markets. The exception: Pittsburgh, where heavy plate deliveries advanced, but sheet remained unchanged.

Midwest Active — The most active markets, in terms of delivery changes, are Chicago, Detroit, and Cleveland. In addition to sheet, hot-rolled bar, and plate, Chicago producers reported a week's stepup for buttweld pipe and linepipe. At Cleveland, structurals also moved out a week.

Along the East Coast, hot-rolled sheet and strip deliveries extended a week, while cold-rolled stayed at the present 3-5 weeks.

More Stretchout? — There are conflicting ideas about the delivery stretchouts. But, supporting the idea they will continue, are these facts: At Detroit shipping times are moving out, despite the unsettled auto production situation. Throughout the market, plate demand is stronger, with some mills quoting November delivery. Midwest warehouses are extending order lead times, but haven't yet boosted their floor inventories.

Delivery Promises at a Glance

	East	Pittsburgh	Cleveland	Detroit	Chicago	West Coast
CR Carbon Sheet	3-5 wks	3-5 wks	4-6 wks	4-5 wks	5-7 wks	6 wks
HR Carbon Sheet	3-4 wks	3-4 wks	3-4 wks	2-4 wks	4-5 wks	6 wks
CR Carbon Strip	3-5 wks	4-5 wks	4-6 wks	4-5 wks	5-6 wks	6 wks
HR Carbon Strip	3-4 wks	3-4 wks	3-4 wks	2-4 wks	4-5 wks	6 wks
HR Carbon Bars	2-4 wks	2-3 wks	3-4 wks	1-4 wks	4-5 wks	4-5 wks
CF Carbon Bars	2-4 wks	2-3 wks	Stock–4 wks	Stock–5 wks	2-4 wks	1-2 wks
Heavy Plate	3-5 wks	4-5 wks			3-5 wks	8 wks
Light Plate	2-3 wks	1-2 wks	3-4 wks		3-5 wks	7 wks
Merchant Wire	Stock	Stock	Stock		3-4 wks	Stock
Oil Country Goods	Stock	Stock	Stock		Stock–4 wks	
Linepipe	Stock	1-4 wks	Stock		3-4 wks	Stock
Buttweld Pipe	Stock	Stock	Stock	Stock–2 wks	2-4 wks	Stock
Structurals	2-4 wks	1-2 wks	2-4 wks	1-4 wks	3-4 wks	Stock–4 wks
CR Stainless Sheet	Stock–4 wks	Stock–3 wks	Stock–3 wks	Stock–5 wks		
CR Stainless Strip	Stock–4 wks	Stock–3 wks	Stock–3 wks	Stock–5 wks		

Sheet and Strip — Miscellaneous demand for sheet is holding up well, despite the auto production delays.

On the **East Coast,** mills are quoting a week longer on hot-rolled sheet and strip. All specialty sheet products are on advanced delivery terms. Galvanized extends from late October to late November.

Sheet mills at **Pittsburgh** are waiting for auto demand to reach normal levels. But other buyers are active. Galvanized lines are operating at capacity to keep up with demand.

All flat-rolled products have moved out a week at **Detroit.** Sheet delivery estimates at **Chicago** range from 4 to 8 weeks, but 5-6 weeks is about average. Mill operations are speeding up. Some strip mill delivery dates have been missed by about a week.

Bar—This market varies depending on the area. In the **East** and at **Pittsburgh** it's quiet. Mills look for a lengthening of deliveries once auto demand picks up, but it hasn't happened yet. All bar mill products are still readily available.

At **Chicago,** however, some bar mill cycles have begun to stretch out. These have gone from 4 weeks to a little over 5 weeks. With this trend, it's possible 60-day cycles could be in force by mid-October, doubling present delivery times.

Plates and Shapes — Demand continues to move up, but may be leveling off. Despite strong September bookings, **East Coast** mills are disturbed because buyers are not doing more advance ordering. However, this is not the case in shapes. Some **Eastern** buyers are ordering more stock tonnage, along with job tonnage.

At **Pittsburgh** most products are still readily available. Only heavy plates have tightened a little.

Tinplate — Many can companies have advised mills they will cut fourth quarter shipments as much as 40 pct. As far as the mills can determine, there will be virtually no stockpiling in the quarter. Users are apparently confident about future supply and stable prices.

COMPARISON OF PRICES

(Effective Sept. 25, 1961)

Steel prices on this page are the average of various f.o.b. quotations of major producing areas: Pittsburgh, Chicago, Gary, Cleveland, Youngstown.

Price changes from previous week are shown by an asterisk (*).

	Sept. 25 1961	Sept. 18 1961	Aug. 28 1961	Sept. 27 1960
Flat-Rolled Steel: (per pound)				
Hot-rolled sheets	5.10¢	5.10¢	5.10¢	5.10¢
Cold-rolled sheets	6.275	6.275	6.275	6.275
Galvanized sheets (10 ga.)	6.875	6.875	6.875	6.875
Hot-rolled strip	5.10	5.10	5.10	5.10
Cold-rolled strip	7.425	7.425	7.425	7.425
Plate	5.30	5.30	5.30	5.30
Plates, wrought iron	14.10	14.10	14.10	14.10
Stainl's C-R strip (No. 302)	49.50	49.50	52.00	52.00
Tin and Terneplate: (per base box)				
Tin plates (1.50 lb.) cokes	$10.65	$10.65	$10.65	$10.65
Tin plates, electro (0.50 lb.)	9.35	9.35	9.35	9.35
Special coated mfg. ternes	9.90	9.90	9.90	9.90
Bars and Shapes: (per pound)				
Merchant bar	5.675¢	5.675¢	5.675¢	5.675¢
Cold finished bar	7.65	7.65	7.65	7.65
Alloy bar	6.725	6.725	6.725	6.725
Structural shapes	5.50	5.50	5.50	5.50
Stainless bars (No. 302)	46.75	46.75	46.75	46.75
Wrought iron bars	14.90	14.90	14.90	14.90
Wire: (per pound)				
Bright wire	8.00¢	8.00¢	8.00¢	8.00¢
Rails: (per 10 lb.)				
Heavy rails	$5.75	$5.75	$5.75	$5.75
Light rails	6.725	6.725	6.725	6.725
Semifinished Steel: (per net ton)				
Rerolling billets	$80.00	$80.00	$80.00	$80.00
Slabs, rerolling	80.00	80.00	80.00	80.00
Forging billets	99.50	99.50	99.50	99.50
Alloys, blooms, billets, slabs	119.00	119.00	119.00	119.00
Wire Rods and Skelp: (per pound)				
Wire rods	6.49¢	6.40¢	6.40¢	6.40¢
Skelp	5.05	5.05	5.05	5.05
Finished Steel Composite: (per pound)				
Base price	6.196¢	6.196¢	6.196¢	6.196¢

	Sept. 25 1961	Sept. 18 1961	Aug. 28 1961	Sept. 27 1960
Pig Iron: (per gross ton)				
Foundry, del'd Phila.	$70.68	$70.68	$70.68	$70.57
Foundry, South Cin'ti.	71.92	71.92	71.92	73.87
Foundry, Birmingham	62.50	62.50	62.50	62.50
Foundry, Chicago	66.50	66.50	66.50	66.50
Basic, del'd Philadelphia	70.11	70.11	70.11	70.07
Basic Valley furnace	66.00	66.00	66.00	66.00
Malleable, Chicago	66.50	66.50	66.50	66.50
Malleable, Valley	66.50	66.50	66.50	66.50
Ferromanganese 74-76 pct Mn. cents per lb‡	11.00	11.00	11.00	11.00
Pig Iron Composite: (per gross ton)				
Pig iron	$66.44	$66.44	$66.44	$66.41
Scrap: (per gross ton)				
No. 1 steel, Pittsburgh	$37.50	$37.50	$36.50	$31.50
No. 1 steel, Phila. area	40.50	40.50	39.50	34.50
No. 1 steel, Chicago	40.50	40.50	39.50	28.50
No. 1 bundles, Detroit	35.50	35.50	35.50	27.50
Low phos., Youngstown	43.50	43.50	41.50	33.50
No. 1 mach'y cast. Pittsburgh	45.50	45.50	45.50	47.50
No. 1 mach'y cast. Phila.	49.50	49.50	49.50	49.50
No. 1 mach'y cast. Chicago	50.50	50.50	49.50	43.50
Steel Scrap Composite: (per gross ton)				
No. 1 hvy. melting scrap	$39.50	$39.50	$38.50	$31.50
No. 2 bundles	26.83*	26.50	25.17	21.17
Coke, Connellsville: (per net ton at oven)				
Furnace coke, prompt	$14.75-15.50	14.75-15.50	14.75-15.50	14.75-15.50
Foundry coke, prompt	18.50	18.50	18.50	18.50
Nonferrous Metals: (cents per pound to large buyers)				
Copper, electrolytic, Conn.	$31.00	$31.00	$31.00	$33.00
Copper, Lake, Conn.	31.00	31.00	31.00	33.00
Tin, Straits, N. Y.	121.75†	121.375**	122.25	102.25
Zinc, East St. Louis	11.50	11.50	11.50	13.00
Lead, St. Louis	11.00	11.00	11.00	11.80
Aluminum, ingot	24.00*	26.00	26.00	26.00
Nickel, electrolytic	74.00	74.00	74.00	74.00
Magnesium, ingot	36.00	36.00	36.00	36.00
Antimony, Laredo, Tex.	29.50	29.50	29.50	29.50

† Tentative. ‡ Average. ** Revised.

Finished Steel Composite

Weighted index of steel bars, shapes, plates, wire, rails, black pipe, hot and cold rolled sheets and strips.

Pig Iron Composite

Based on averages for basic iron at Valley furnaces and foundry iron at Chicago, Philadelphia, Buffalo and Birmingham.

Steel Scrap Composite

Average of No. 1 heavy melting steel scrap and No. 2 bundles delivered to consumers at Pittsburgh, Philadelphia and Chicago.

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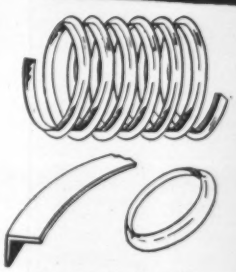
FOR SEGMENT OR CIRCLE BENDING OF ANGLES
THE TREND IS TO THOMAS



Thomas Angle Rolls will handle angles up to 6 x 6 x 7/8"

Thomas Angle Benders are of all steel construction and come in two styles and four sizes. Standard rolls permit "leg in" and "leg out" bending of angles. The machines may be converted for bending flats, rounds, squares, beams, channels, pipe and other shapes.

THOMAS MACHINE MANUFACTURING CO.
PITTSBURGH 33, PA.

Write for Bulletin 314-A

65

Market Eases Into Fourth Quarter

The market seems to be playing a waiting game with industrial lists due late this week.

October scrap output should be high, but some is owed on September orders. Export will be good in the next quarter.

■ Prices held steady to firm in a quiet market during the past week. Industrial lists can be expected to point the direction of the market. The influence of several factors will be felt: Some auto plants will have to use October scrap to settle September accounts; but greater scrap generation can be expected as auto output picks up.

Japanese export order, variously reported at 65 to 71 cargoes, is not as small as at first feared. West Coast shippers now expect to ship about as much as in the current quarter. A little boost is expected in the East. Orders from Europe appear to be weakening.

Pittsburgh—Prices of most grades are holding firm in a quiet market. Local purchases have moved No. 2 bundles up another $1. Dealers are reportedly being quoted $39 for shipment of No. 1 heavy melting to a nearby district. The industrial picture is confused by plant shutdowns. It is expected most of the October output of a local auto plant will be taken by those who are owed scrap from September. In any event, September scrap losses figure to tighten supply and keep pressure on prices.

Chicago—In the face of increasing mill resistance, the market marked time, waiting to see which direction factory bundle lists will move. Because of some delinquencies on the auto lists, bundles are expected to continue at existing price levels. Dealers appear to be in a slightly weaker position. But broker buying efforts at lower price levels were not successful.

Philadelphia—With mills on an increased production basis, the market is holding its present level. No. 1 busheling moved up $1. Railroad specialties, cast iron car wheels, and 18-in. rails also advanced $1. Increased demand for cast pushed up the prices. Export is still a big factor. With congestion continuing in their ports, some dealers fear Japanese buyers may spread new orders past the first of the year.

New York—Dealers, happy over the news that the Japanese will do more buying in the East next quarter, are somewhat apprehensive when they look in the other direction. Scrap is still moving to Europe. But there has been a noticeable drop in new orders. Nevertheless, dealers say this market is strong.

Detroit—Changes in the market aren't expected to be big in October. Tonnage offered will be up from September. September buyers didn't get all they ordered, and will get make-up deliveries this month. There is no evidence of real strength. It will be sometime in October before Fisher Body gets going on shipments of bundles, but the tonnage should be big once it starts.

Cleveland — Market has about reached limit it can go without support from big mill buying. This has not appeared so far. Lists this week will determine immediate future but no great change was anticipated. Bidding is clouded by undelivered tonnage due to GM auto strikes here.

Cincinnati — Market has about run out of gas and will have trouble holding present levels. Only one local mill is expected to be in the market. Heavy auto tonnage was lost through strikes and this may hold prices up.

St. Louis—Market here seems to have lost some of its strength. A more stable feeling exists. If anything, the market seems to be leaning slightly to the easier side. A good flow of scrap is moving at present prices. Some outside scrap has been moving into this area. No added strength is seen for at least 30 days.

Birmingham — Scrap buying in the area continues fair. Prices are unchanged. A $2-per-ton advance in electric furnace grades found ready takers, but dealer offers of quantities of other grades at higher prices found no one interested. Movement of cast has slowed.

Buffalo—The market is quiet, but dealers look to renewed activity by the end of this week.

Boston — Prices remained unchanged this week but there was some minor activity. This has lead to the development of a strong undertone to the market, holding prices firm and steady.

Houston — The market showed more zip this week as the district mill issued purchase orders for selected grades. Price ranged from $1 to $2 higher than previous prices. The orders are good through October.

West Coast—Dealers are pleased with new Japanese commitments. They had expected a big reduction. It appears that 25 to 26 cargoes will go out of West Coast ports during the next quarter. That's about the same as the last quarter.

SCRAP PRICES *(Effective Sept. 25, 1961)*

Iron and Steel Scrap

Going prices of iron and steel scrap as obtained in the trade by THE IRON AGE based on representative tonnages. All prices are per gross ton delivered to consumer unless otherwise noted.

Pittsburgh

No. 1 hvy. melting	$37.00 to $38.00
No. 2 hvy. melting	29.00 to 30.00
No. 1 dealer bundles	38.00 to 39.00
No. 1 factory bundles	47.00 to 48.00
No. 2 bundles	27.00 to 28.00
No. 1 busheling	37.00 to 38.00
Machine shop turn.	15.00 to 16.00
Shoveling turnings	20.00 to 21.00
Cast iron borings	19.00 to 20.00
Low phos. punch'gs plate	46.00 to 47.00
Heavy turnings	32.00 to 33.00
No. 1 RR hvy. melting	43.00 to 44.00
Scrap rails, random lgth.	46.00 to 47.00
Rails 2 ft and under	52.00 to 53.00
RR specialties	48.00 to 49.00
No. 1 machinery cast.	45.00 to 46.00
Cupola cast.	37.00 to 38.00
Heavy breakable cast.	33.00 to 34.00
Stainless	
18-8 bundles and solids	190.00 to 195.00
18-8 turnings	155.00 to 160.00
430 bundles and solids	85.00 to 90.00
410 turnings	55.00 to 60.00

Chicago

No. 1 hvy. melting	$40.00 to $41.00
No. 2 hvy. melting	36.00 to 37.00
No. 1 dealer bundles	41.00 to 42.00
No. 1 factory bundles	45.00 to 46.00
No. 2 bundles	26.00 to 27.00
No. 1 busheling	40.00 to 41.00
Machine shop turn.	19.00 to 20.00
Mixed bor. and turn.	21.00 to 22.00
Shoveling turnings	22.00 to 23.00
Cast iron borings	21.00 to 22.00
Low phos. forge crops	50.00 to 51.00
Low phos. punch'gs plate, ¼ in. and heavier	48.00 to 49.00
Low phos. 2 ft and under	46.00 to 47.00
No. 1 RR hvy. melting	44.00 to 45.00
Scrap rails, random lgth.	50.00 to 51.00
Rerolling rails	62.00 to 63.00
Rails 2 ft and under	53.00 to 54.00
Angles and splice bars	48.00 to 49.00
RR steel car axles	61.00 to 62.00
RR couplers and knuckles	48.00 to 49.00
No. 1 machinery cast.	50.00 to 51.00
Cupola cast.	44.00 to 45.00
Cast iron wheels	36.00 to 37.00
Malleable	49.00 to 50.00
Stove plate	38.00 to 39.00
Steel car wheels	47.00 to 48.00
Stainless	
18-8 bundles and solids	190.00 to 195.00
18-8 turnings	110.00 to 115.00
430 bundles and solids	95.00 to 100.00
430 turnings	55.00 to 60.00

Philadelphia Area

No. 1 hvy. melting	$40.00 to $41.00
No. 2 hvy. melting	36.00 to 37.00
No. 1 dealer bundles	43.00 to 44.00
No. 2 bundles	26.00 to 27.00
No. 1 busheling	43.00 to 44.00
Machine shop turn.	13.00 to 14.00
Mixed bor. short turn.	16.00 to 17.00
Cast iron borings	14.00 to 15.00
Shoveling turnings	19.00 to 20.00
Clean cast. chem. borings	29.00 to 30.00
Low phos. 5 ft and under	43.00 to 45.00
Low phos. 2 ft punch'gs	45.00 to 46.00
Elec. furnace bundles	44.00 to 45.00
Heavy turnings	27.00 to 28.00
RR specialties	45.00 to 46.00
Rails, 18 in. and under	54.00 to 55.00
Cupola cast.	39.00 to 40.00
Heavy breakable cast.	41.00 to 42.00
Cast iron car wheels	43.00 to 44.00
Malleable	48.00 to 49.00
No. 1 machinery cast.	49.00 to 50.00

Cincinnati

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$35.00 to $36.00
No. 2 hvy. melting	29.00 to 30.00
No. 1 dealer bundles	36.00 to 37.00
No. 2 bundles	22.00 to 23.00
Machine shop turn.	9.00 to 10.00
Shoveling turnings	14.00 to 15.00
Cast iron borings	14.00 to 15.00
Low phos. 18 in. and under	42.00 to 43.00
Rails, random length	42.00 to 43.00
Rails, 18 in. and under	47.00 to 48.00
No. 1 cupola cast.	33.00 to 34.00
Heavy breakable cast.	30.00 to 31.00
Drop broken cast.	44.00 to 45.00

Youngstown

No. 1 hvy. melting	$41.00 to $42.00
No. 2 hvy. melting	28.50 to 29.50
No. 1 dealer bundles	41.00 to 42.00
No. 2 bundles	24.00 to 25.00
Machine shop turn.	17.00 to 18.00
Shoveling turnings	19.00 to 20.00
Low phos. plate	43.00 to 44.00

Cleveland

No. 1 hvy. melting	$38.50 to $39.50
No. 2 hvy. melting	25.00 to 26.00
No. 1 dealer bundles	38.50 to 39.50
No. 1 factory bundles	43.00 to 44.00
No. 2 bundles	22.50 to 23.50
No. 1 busheling	38.50 to 39.50
Machine shop turn.	15.00 to 16.00
Mixed bor. and turn.	18.00 to 19.00
Shoveling turnings	18.00 to 19.00
Cast iron borings	18.00 to 19.00
Cut structural & plates, 2 ft & under	42.00 to 43.00
Low phos. punch'gs plate	39.50 to 40.50
Drop forge flashings	38.50 to 39.50
Foundry steel, 2 ft & under	36.00 to 37.00
No. 1 RR hvy. melting	42.50 to 43.50
Rails 2 ft and under	49.00 to 50.00
Rails 18 in. and under	52.00 to 53.00
Steel axle turnings	28.00 to 29.00
Railroad cast.	48.00 to 49.00
No. 1 machinery cast.	48.00 to 49.00
Stove plate	40.00 to 41.00
Malleable	52.00 to 53.00
Stainless	
18-8 bundles	180.00 to 185.00
18-8 turnings	105.00 to 110.00
430 bundles	85.00 to 90.00

Buffalo

No. 1 hvy. melting	$33.00 to $34.00
No. 2 hvy. melting	26.00 to 27.00
No. 1 busheling	33.00 to 34.00
No. 1 dealer bundles	33.00 to 34.00
No. 2 bundles	24.00 to 25.00
Machine shop turn.	13.00 to 14.00
Mixed bor. and turn.	14.00 to 15.00
Cast iron borings	15.00 to 16.00
Low phos. plate	39.00 to 40.00
Structural and plate, 2 ft and under	41.00 to 42.00
Rails 2 ft and under	50.00 to 51.00
Scrap rails, random lgth.	40.00 to 41.00
No. 1 machinery cast.	43.00 to 44.00
No. 1 cupola cast.	37.00 to 38.00

St. Louis

No. 1 hvy. melting	$36.00 to $37.00
No. 2 hvy. melting	31.00 to 32.00
Foundry steel, 2 ft.	33.00 to 34.00
No. 1 dealer bundles	36.00 to 37.00
No. 2 bundles	26.00 to 27.00
Machine shop turn.	16.50 to 17.50
Shoveling turnings	18.50 to 19.50
Cast iron borings	26.00 to 27.00
No. 1 RR hvy. melting	40.00 to 41.00
Rails, random lengths	43.00 to 44.00
Rails, 18 in. and under	46.00 to 47.00
RR specialties	43.00 to 44.00
Cupola cast.	37.00 to 38.00
Heavy breakable cast.	32.00 to 33.00
Stove plate	32.00 to 33.00
Cast iron car wheels	34.00 to 35.00
Rerolling rails	56.00 to 57.00
Unstripped motor blocks	34.00 to 35.00

Birmingham

No. 1 hvy. melting	$38.00 to $39.00
No. 2 hvy. melting	30.00 to 31.00
No. 1 dealer bundles	38.00 to 39.00
No. 2 bundles	21.00 to 22.00
No. 1 busheling	40.00 to 41.00
Machine shop turn.	18.00 to 19.00
Shoveling turnings	20.00 to 21.00
Cast iron borings	10.00 to 11.00
Electric furnace bundles	40.00 to 41.00
Elec. furnace, 3 ft & under	38.00 to 39.00
Bar crops and plate	45.00 to 46.00
Structural and plate, 2 ft	44.00 to 45.00
No. 1 RR hvy. melting	39.00 to 40.00
Scrap rail, random lgth.	42.00 to 43.00
Rails, 18 in. and under	46.00 to 47.00
Angles and splice bars	44.00 to 45.00
No. 1 cupola cast.	42.00 to 43.00
Stove plate	42.00 to 43.00
Cast iron car wheels	34.00 to 35.00
Unstripped motor blocks	31.00 to 32.00

New York

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$31.00 to $32.00
No. 2 hvy. melting	25.00 to 26.00
No. 2 dealer bundles	19.00 to 20.00
Mixed. bor. and turn.	5.00 to 6.00
Machine shop turnings	5.00 to 6.00
Shoveling turnings	7.00 to 8.00
Clean cast. chem. borings	19.00 to 20.00
No. 1 machinery cast.	38.00 to 39.00
Mixed yard cast.	34.00 to 35.00
Heavy breakable cast.	32.00 to 33.00
Stainless	
18-8 prepared solids	160.00 to 165.00
18-8 turnings	80.00 to 85.00
430 prepared solids	65.00 to 70.00
430 turnings	20.00 to 25.00

Detroit

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$36.00 to $37.00
No. 2 hvy. melting	31.00 to 32.00
No. 1 dealer bundles	35.00 to 36.00
No. 2 bundles	22.00 to 23.00
No. 1 busheling	34.00 to 35.00
Drop forge flashings	34.00 to 35.00
Machine shop turn.	12.00 to 13.00
Mixed bor. and turn.	15.00 to 16.00
Shoveling turnings	16.00 to 17.00
Cast iron borings	15.00 to 16.00
Heavy breakable cast.	28.00 to 29.00
Mixed cupola cast.	31.00 to 32.00
Automotive cast	41.00 to 42.00
Stainless	
18-8 bundles and solids	175.00 to 180.00
18-8 turnings	80.00 to 85.00
430 bundles and solids	70.00 to 75.00

Boston

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$28.00 to $29.00
No. 2 hvy. melting	25.00 to 26.00
No. 1 dealer bundles	31.50 to 32.50
No. 2 bundles	19.00 to 20.00
No. 1 busheling	31.50 to 32.50
Machine shop turn.	4.00 to 5.00
Shoveling turnings	8.50 to 9.00
Clean cast. chem. borings	17.50 to 18.50
No. 1 machinery cast.	38.00 to 39.00
Mixed cupola cast.	30.00 to 31.00
Heavy breakable cast.	30.50 to 31.50

San Francisco

No. 1 hvy. melting	$45.00
No. 2 hvy. melting	42.00
No. 1 dealer bundles	33.00
No. 2 bundles	$25.00 to 26.00
Machine shop turn.	17.00
Cast iron borings	17.00
No. 1 cupola cast.	50.00

Los Angeles

No. 1 hvy. melting	$44.00
No. 2 hvy. melting	41.00
No. 1 dealer bundles	33.00
No. 2 bundles	$25.00 to 26.00
Machine shop turn.	16.00
Shoveling turnings	16.00
Cast iron borings	16.00
Elec. furnace 1 ft and under (foundry)	52.00
No. 1 cupola cast.	47.00 to 48.00

Seattle

No. 1 hvy. melting	$45.00
No. 2 hvy. melting	42.00
No. 2 bundles	$26.00 to 27.00
No. 1 cupola cast.	36.00 to 37.00
Mixed yard cast.	31.00 to 32.00

Hamilton, Ont.

Brokers buying prices per net ton on cars:

No. 1 hvy. melting	$30.00
No. 2 hvy. melting cut 3 ft and under	27.00
No. 1 dealer bundles	31.00
No. 2 bundles	23.50
Mixed steel scrap	22.00
Bush., new fact., prep'd.	30.00
Bush., new fact., unprep'd	24.00
Machine shop turn.	8.00
Short steel turn.	12.00
Mixed bor. and turn.	12.00
Cast scrap	32.00

Houston

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$37.00
No. 2 hvy. melting	34.00
No. 2 bundles	24.00
Machine shop turn.	15.00
Shoveling turnings	13.00
Cut structural plate 2 ft & under	$44.00 to 45.00
Unstripped motor blocks	28.00 to 29.00
Cupola cast.	36.00 to 37.00
Heavy breakable cast.	28.00 to 29.00

Aluminum Ingot Price Dropped

Alcoa cut the price of aluminum ingot and Reynolds quickly followed.

A reduced price offer to U. S. customers by Aluminum Co. of Canada was a major factor in the price cuts.

■ Aluminum Co. of America lowered its ingot price late last week under pressure of Canadian producers. Reynolds Metals immediately met the cut, from 26¢ per lb to 24¢. Kaiser Aluminum & Chemical Corp. early this week was "still studying the situation."

Alcoa cited two factors that "forced" it to drop the price: 1. A reduced price offer to U. S. customers by Aluminum Co. of Canada; 2. "A continuous undercutting of U. S. prices by certain European sources over recent years."

Under Fire—Actually, the U. S. ingot price had been under fire for some time. For example, the highly-publicized price of aluminum can stock at only a few cents over ingot price brought about pressure from extruders and others for a lower ingot price.

With the new Canadian price, something had to go. But it came at a tough time for U. S. producers. The market apparently was firming up. And they had been complaining for some time that prices needed to be increased because of a profit squeeze. Furthermore, primary aluminum had been stable; unchanged since December, 1959.

Exchange Factor—Aluminium Ltd., parent company of Aluminum Co. of Canada and Aluminium, Ltd., Sales, used the changed value of the Canadian dollar for its Canadian price offer. U. S. customers were given an option to buy at the established U. S. price of 26¢ per lb, or at a new price based on the Canadian price of 23.25¢ per lb in Canadian funds at the border, plus 1.25¢ per lb import duty, and handling and freight charges.

The new offer would have meant a price below the domestic price for many U. S. fabricating plants if the 26¢-per-lb price had held. With the Canadian dollar selling at a discount of about 3 pct from the U. S. dollar, the U. S. buyer would get an added advantage in ordering on the Canadian price. The offer made aluminum ingot available at the border for about 23.8¢ in U. S. funds, including duty.

Price War—Alcoa termed the recent developments a "price war in the aluminum industry, between foreign and domestic producers." A spokesman said the company regards the Canadian action as "a departure from Aluminium's traditional policy of selling ingot in the U. S. at the established price," and outside the country at the world price.

Alcoa also lowered prices on many primary shapes. One cut noted is on 6063 extrusion billet, from 27.2¢ to 25.5¢. This is a big-selling shape used in building lines. No price changes were made in mill shapes.

Lead-Zinc

Small producers of lead and zinc finally got some relief from Congress. Subsidy payments of $16.5 million will be paid over the next four years under a bill sent to the White House last week. President Kennedy is expected to approve the bill.

The subsidy bill provides $4.5 million for calendar years 1962 and 1963; $4 million for 1964; and $3.5 million for 1965. Payments will go to miners of less than 1500 tons each of lead and zinc the first year; 1200 tons the second year; 900 tons the third year; and 600 tons the fourth year.

The amount paid to each producer will be 75 pct of the difference between the market price and 14.5 cents for lead; and 55 pct of the difference between the market price and 14.5 cents for zinc.

The subsidy bill was passed after efforts to impose a high tariff on imports of the metals were rejected by the Senate Finance Committee.

Western congressmen characterize the subsidy as a "slight solution" to the ills of the depressed lead and zinc industry. They still may seek more potent legislation.

Tin Prices for the Week

September 19—120.75; September 20—120.50; September 21—120.75; September 22—121.50; September 25—121.375.*

* Estimate.

Primary Prices

(cents per lb.)	current price	last price	date of change
Aluminum Ingot	24.00	26.00	9/25/61
Copper (E)	31.00	30.00	5/16/61
Copper (CS)	31.00	30.00	5/17/61
Copper (L)	31.00	30.00	5/17/61
Lead, St. L.	10.80	11.80	12/13/60
Lead, N. Y.	11.00	12.00	12/13/60
Magnesium Ingot	36.00	34.50	8/13/56
Magnesium pig	35.25	33.75	8/13/56
Nickel	81.25	74.00	6/30/61
Titanium sponge	150-160	162-182	8/1/59
Zinc, E. St. L.	11.50	12.50	1/12/61
Zinc, N. Y.	12.00	13.00	1/12/61

ALUMINUM: 99% Ingot. COPPER: (E) = electrolytic, (CS) = custom smelters, electrolytic. (L) = lake. LEAD: common grade. MAGNESIUM: 99.8% pig Velasco, Tex. NICKEL: Port Colborne, Canada. ZINC: prime western. Other primary prices, pg. 123.

MILL PRODUCTS

(Cents per lb unless otherwise noted)

ALUMINUM

(Base 30,000 lb, f.o.b. customer's plant)

Flat Sheet (Mill Finish and Plate)

("F" temper except 6061-0)

Alloy	.030-.037	.047-.060	.076-.096	.154-.250
1100, 3003	48.4	47.4	46.4	45.4
5052	55.8	53.0	50.8	47.8
6061-0	53.0	50.3	48.4	47.8

Extruded Solid Shapes

Factor	6063 T-5	6062 T-6
1-17	45.3-46.8	54.0-61.8
18-32	45.8-47.5	58.6-81.5
33-38	49.5-52.2	85.1-96.6
39-44	59.8-63.6	102.0-124.0

Screw Machine Stock—2011-T-3

Size"	7/32-5/16	11/32-23/32	3/4-1 1/16	1 3/32-1 1/2
Price	60.0	59.2	57.7	55.3

Roofing Sheet, Corrugated

(Per sheet, 26" wide base, 16,000 lb)

Length"→	72	96	120	144
.019 gage	$1.506	$2.013	$2.515	$3.017

MAGNESIUM

(F.o.b. shipping pt., carload frt. allowed)

Sheet and Plate

Type↓ Gage→	.250 3.00	.250-2.00	.188	.081	.032
AZ31B Stand. Grade	.....	67.9	69.0	77.9	103.1
AZ31B Spec.	.....	93.3	96.9	108.7	171.3
Tread Plate	.....	70.6	71.7	.....	.....
Tooling Plate	73.0	.....	.....	.....	.....

Extruded Shapes

factor→	6-8	12-14	24-26	36-38
Comm. Grade (AZ31C)	65.3	65.3	66.1	71.5
Spec. Grade (AZ31B)	84.6	85.7	90.6	104.2

Alloy Ingot

AZ91B (Die Casting) ..... 37.25 (delivered)
AZ63A, AZ92A, AZ91C (Sand Casting) 40.75 (Velasco, Tex.)

NICKEL, MONEL, INCONEL

(Base prices f.o.b. mill)

	"A" Nickel	Monel	Inconel
Sheet, CR	147	126	145
Strip, CR	133	114	145
Rod, bar, HR	116	95	116
Angles, HR	116	95	116
Plates, HR	139	116	133
Shot, blocks	...	93	...

COPPER, BRASS, BRONZE

(Freight included in 5000 lbs)

	Sheet	Wire	Rod	Tube
Copper	56.13	.....	53.61	57.32
Brass, Yellow	49.27	49.56	49.21	53.43
Brass, Low	52.15	52.44	52.09	56.21
Brass, Rod	53.17	53.46	53.11	57.23
Brass, Naval	53.94	60.25	47.75	58.10
Munts Metal	51.94	.....	47.25	.....
Comm. Bz.	54.73	55.02	54.67	58.34
Mang. Bz.	57.71	61.54	51.27	.....
Phos. Bz. 5%	76.97	76.72	77.47	78.90

Free Cutting Brass Rod 34.77

TITANIUM

(Base 30,000 lb. f.o.b. customer's plant)

Sheet and strip, commercially pure, $6.75-$13.00; alloy, $13.40-$17. Plate HR, commercially pure, $5.25-$9.00; alloy, $8.00-$10.00. Wire, rolled and/or drawn, commercially pure, $5.55-$6.05; alloy, $5.55-$9.00; bar, HR or forged commercially pure, $4.00-$4.50; alloy, $4.00-$6.25; billets, HR, commercially pure, $3.20-$3.70; alloy, $3.20-$4.75.

PRIMARY METAL

(Cents per lb unless otherwise noted)

Antimony, American, Laredo, Tex.. 32.50
Beryllium Aluminum 5% Be, Dollars per lb contained Be ..... $ 5.00
Beryllium copper, per lb conta'd Be. $43.00
Beryllium 97% lump or beads, f.o.b. Cleveland, Reading $70.00
Bismuth, ton lots ..... $ 2.25
Cadmium, del'd ..... $ 1.70
Calcium, 99.9% small lots ..... $ 4.55
Chromium, 99.8% metallic base .... $ 1.31
Cobalt, 97-99% (per lb)...$1.50 to $ 1.57
Germanium, per gm, f.o.b. Miami, Okla., refined .....$29.95 to $36.95
Gold, U. S. Treas., per troy oz.....$35.00
Indium, 99.9% dollars per troy oz..$ 2.25
Iridium, dollars per troy oz.....$75 to $85
Lithium, 98% .....$9.00 to $12.00
Magnesium sticks, 10,000 lb. 57.00
Mercury dollars per 76-lb flask f.o.b. New York .....$188 to $191
Nickel oxide sinter at Buffalo, N. Y. or other U. S. points of entry, contained nickel 77.50
Palladium, dollars per troy oz..$24 to $26
Platinum, dollars per troy oz...$82 to $85
Rhodium .....$137 to $140
Silver ingots (¢ per troy oz.).....91.375
Thorium, per pg $43.00
Vanadium .....$ 3.65
Zirconium sponge .....$ 5.00

REMELTED METALS

Brass Ingot

(Cents per lb delivered, carloads)

85-5-5 ingot
- No. 115 ..... 32.00
- No. 120 ..... 31.25
- No. 123 ..... 30.50

80-10-10 ingot
- No. 305 ..... 36.00
- No. 315 ..... 33.75

88-10-2 ingot
- No. 210 ..... 43.75
- No. 215 ..... 40.50
- No. 245 ..... 35.75

Yellow ingot
- No. 405 ..... 27.50

Manganese bronze
- No. 421 ..... 31.25

Aluminum Ingot

(Cents per lb del'd 30,000 lb and over)

95.5 aluminum-silicon alloys
- 0.30 copper max. 23.25-23.75
- 0.60 copper max. 23.00-23.50

Piston alloys (No. 132 type)...25.00-26.00
No. 12 alum. (No. 2 grade)...21.25-21.75
108 alloy 21.75-22.25
195 alloy 24.25-24.75
13 alloy (0.60 copper max.)...23.00-23.50
AXS-679 (1 pct zinc) 21.50-22.50

Steel deoxidizing aluminum notch bar granulated or shot
- Grade 1—95-97½% 22.75-23.75
- Grade 2—92-95% 21.50-22.50
- Grade 3—90-92% 20.50-21.50
- Grade 4—85-90% 19.50-20.50

SCRAP METALS

Brass Mill Scrap

(Cents per pound, add 1¢ per lb for shipments of 20,000 lb and over)

	Heavy	Turnings
Copper	27	26¼
Yellow brass	20⅜	18½
Red brass	23⅞	23⅛
Comm. bronze	24⅜	24
Mang. bronze	19¼	18½
Free cutting rod ends	19½	

Customs Smelters Scrap

(Cents per pound carload lots, delivered to refinery)

No. 1 copper wire	27⅜
No. 2 copper wire	25⅜
Light copper	23½
*Refining brass	24½
Copper bearing material	23½

*Dry Copper content.

Ingot Makers Scrap

(Cents per pound carload lots, delivered to refinery)

No. 1 copper wire	27⅜
No. 2 copper wire	25⅜
Light copper	23½
No. 1 composition	25
No. 1 comp. turnings	24
Hvy. yellow brass solids	19
Heavy yellow brass turnings	18
Radiators	20½
Aluminum	
Mixed old cast.	12½—13
Mixed new clips	14½—15
Mixed turnings, dry	13 —14

Dealers' Scrap

(Dealers' buying price f.o.b. New York in cents per pound)

Copper and Brass

No. 1 copper wire	24 —24½
No. 2 copper wire	22 —22½
Light copper	19¾—20¼
Auto radiators (unsweated)	16½—17
No. 1 composition	21 —21½
No. 1 composition turnings	20½—21
Cocks and faucets	17¼—17¾
Clean heavy yellow brass	15 —15¼
Brass pipe	17 —17½
New soft brass clippings	18¾—19¼
No. 1 brass rod turnings	16½—17

Aluminum

Alum. pistons and struts	7 — 7½
Aluminum crankcase	9½—10
1100 (2s) aluminum clippings	11¾—12¼
Old sheet and utensils	9½—10
Boring and turnings	4½— 5
Industrial castings	10 —10½
2020 (24s) clippings	11 —11½

Zinc

New zinc clippings	5 — 5¼
Old zinc	3 — 3¼
Zinc routings	1¾— 2
Old die cast scrap	1¾— 2

Nickel and Monel

Pure nickel clippings	56 —58
Clean nickel turnings	43
Nickel anodes	56 —58
Nickel rod ends	56 —58
New Monel clippings	26 —26½
Clean Monel turnings	18½—19
Old sheet Monel	25 —25½
Nickel silver clippings, mixed	20
Nickel silver turnings, mixed	17

Lead

Soft scrap lead	7¼— 7½
Battery plates (dry)	3 — 3¼
Batteries, acid free	2 — 2¼

Miscellaneous

Block tin	90 —92
No. 1 pewter	65 —67
Auto babbitt	46 —47
Mixed common babbitt	10 —10½
Solder joints	15 —15½
Small foundry type	9 — 9½
Monotype	9¼— 9⅝
Lino. and stereotype	8½— 8¾
Electrotype	8 — 8¼
Hand picked type shells	5¾— 6¼
Lino. and stereo. dross	1¾— 2¼
Electro dross	2½— 3

(Effective Sept. 25, 1961)

IRON AGE

STEEL PRICES

Italics identify producers listed in key at end of table. Base prices, f.o.b. mill, in cents per lb., unless otherwise noted. Extras apply.

		BILLETS, BLOOMS, SLABS			PILING	SHAPES, STRUCTURALS			STRIP					
		Carbon Rerolling Net Ton	Carbon Forging Net Ton	Alloy Net Ton	Sheet Steel	Carbon	Hi Str. Low Alloy	Carbon Wide-Flange	Hot-rolled	Cold-rolled	Hi Str. H.R. Low Alloy	Hi Str. C.R. Low Alloy	Alloy Hot-rolled	Alloy Cold-rolled
EAST	Bethlehem, Pa.			$119.00 *B3*		5.55 *B3*	8.10 *B3*	5.55 *B5*						
	Buffalo, N. Y.	$80.00 *R3, B3*	$99.50 *R3, B3*	$119.00 *R3, B3*	6.50 *B3*	5.55 *B3*	8.10 *B3*	5.55 *B3*	5.10 *B3,*	7.425 *S10, R7*	7.575 *B3*			
	Phila., Pa.									7.875 *P15*				
	Harrison, N. J.													15.55 *C11*
	Conshohocken, Pa.		$99.50 *A2*	$121.00 *A2*					5.15 *A2*		7.575 *A2*			
	New Bedford, Mass.									7.875 *R6*				
	Johnstown, Pa.	$80.00 *B3*	$99.50 *B3*	$119.00 *B3*		5.55 *B3*	8.10 *B3*							
	Boston, Mass.									7.975 *T8*				15.90 *T8*
	New Haven, Conn.									7.875 *D1*				
	Baltimore, Md.									7.425 *T8*				15.90 *T8*
	Phoenixville, Pa.					5.55 *P2*	8.10 *P2*	5.55 *P2*						
	Sparrows Pt., Md.								5.10 *B3*		7.575 *B3*			
	New Britain, Wallingford, Conn.			$119.00 *N8*						7.875 *W1,S7*				
	Pawtucket, R. I. Worcester, Mass.									7.975 *N7, A5*				15.90 *N7* 15.70 *T8*
MIDDLE WEST	Alton, Ill.								5.30 *L1*					
	Ashland, Ky.								5.10 *A7*		7.575 *A7*			
	Canton-Massillon, Dover, Ohio		$102.00 *R3*	$119.00 *R3, T5*						7.425 *G4*		10.80 *G4*		
	Chicago, Franklin Park, Evanston, Ill.	$80.00 *U1, R3*	$99.50 *U1, R3,W8*	$119.00 *U1, R3,W8*	6.50 *U1*	5.50 *U1, W8,P13*	8.05 *U1, Y1,W8*	5.50 *U1*	5.10 *W8, N4,A1*	7.425 *A1,T8, M8* 7.525* *M8*	7.575 *W8*		8.40 *W8, S9,I3*	15.55 *A1, S9,G4,T8*
	Cleveland, Ohio									7.425 *A5*		10.75 *A5*	8.40 *J3*	15.60 *N7*
	Detroit, Mich.			$119.00 *R5*					5.10 *G3, M2*	7.425 *M2, S1, D1, P11, B9*	7.575 *G3*	10.80 *S1*		
	Anderson, Ind.									7.425 *G4*				
	Gary, Ind. Harbor, Indiana	$80.00 *U1*	$99.50 *U1*	$119.00 *U1, Y1*		5.50 *U1, I3, Y1*	8.05 *U1, J3*	5.50 *I3*	5.10 *U1, I3,Y1*	7.425 *Y1*	7.575 *U1, I3,Y1*	10.90 *Y1*	8.40 *U1, Y1*	
	Sterling, Ill.	$80.00 *N4*				5.50 *N4*	7.75 *N4*	5.50 *N4*	5.20 *N4*					
	Indianapolis, Ind.									7.575 *R5*				15.70 *R5*
	Newport, Ky.								5.10 *A9*				8.40 *A9*	
	Niles, Warren, Struthers, Ohio Sharon, Pa.		$99.50 *S1, C10*	$119.00 *C10,S1*		5.50 *Y1*			5.10 *R3, S1*	7.425 *R3, T4,S1*	7.575 *R3, S1*	10.80 *R3, S1*	8.40 *S1*	15.55 *S1*
	Owensboro, Ky.	$80.00 *G5*	$99.50 *G5*	$119.00 *G5*										
	Pittsburgh, Midland, Butler, Aliquippa, N. Castle, McKeesport, Pa.	$80.00 *U1, P6*	$99.50 *U1, C11,P6*	$119.00 *U1, C11,B7*	6.50 *U1*	5.50 *U1, J3*	8.05 *U1, J3*	5.50 *U1*	5.10 *P6*	7.425 *B4, M10*			8.40 *S9*	15.55 *S9* 15.60 *N7*
	Weirton, Wheeling, Follansbee, W. Va.				6.50 *U1, W3*	5.50 *W3*		5.50 *W3*	5.10 *W3*	7.425 *W5*	7.575 *W3*	10.80 *W3*		
	Youngstown, Ohio	$80.00 *R3*	$99.50 *Y1, C10*	$119.00 *Y1*			8.05 *Y1*		5.10 *U*	7.425 *Y1,R5*	7.575 *U1, Y1*	10.95 *Y1*	8.40 *U1, Y1*	15.55 *R5, Y1*
WEST	Fontana, Cal.	$90.50 *K1*	$109.00 *K1*	$140.00 *K1*		6.30 *K1*	8.85 *K1*	6.45 *K1*	5.825 *K1*	9.20 *K1*				
	Geneva, Utah		$99.50 *C7*			5.50 *C7*	8.05 *C7*							
	Kansas City, Mo.					5.60 *S2*	8.15 *S2*						8.65 *S2*	
	Los Angeles, Torrance, Cal.		$109.00 *B2*	$139.00 *B2*		6.20 *C7, B2*	8.75 *B2*		5.85 *C7, B2*	9.30 *C1,R5*			9.60 *B2*	17.75 *J3*
	Minnequa, Colo.					5.80 *C6*			6.20 *C6*	9.375 *C6*				
	Portland, Ore.					6.25 *O2*								
	San Francisco. Niles, Pittsburg, Cal.		$109.00 *B2*			6.15 *B2*	8.70 *B2*		5.85 *C7, B2*					
	Seattle, Wash.		$109.00 *B2*	$140.00 *B2*		6.25 *B2*	8.80 *B2*		6.10 *B2*					
SOUTH	Atlanta, Ga.					5.70 *A8*			5.10 *A8*					
	Fairfield, Ala. Birmingham, Ala.	$80.00 *T2*	$99.50 *T2*			5.50 *T2 R3,C16*	8.05 *T2*		5.10 *T2, R3,C16*		7.575 *T2*			
	Houston, Lone Star, Texas		$104.50 *S2*	$124.00 *S2*		5.60 *S2*	8.15 *S2*						8.65 *S2*	

* Electro-galvanized-plus galvanizing extras

(Effective Sept. 25, 1961)

STEEL PRICES

Italics identify producers listed in key at end of table. Base prices, f.o.b. mill, in cents per lb., unless otherwise noted. Extras apply.

		SHEETS								WIRE ROD	TINPLATE†		
		Hot-rolled *18 ga.* & hvyr.	Cold-rolled	Galvanized (Hot-dipped)	Electro-galvanized	Enameling	Long Terne	Hi Str. Low Alloy H.R.	Hi Str. Low Alloy C.R.		Coke* *1.25*-lb. base box	Electro** *0.25*-lb. base box	Thin *0.25* lb. coating in coils
EAST	Buffalo, N. Y.	5.10 *B3*	6.275 *B3*					7.525 *B3*	9.275 *B3*	6.40 *W6, S15*	†Special coated mfg. terne deduct 35¢ from 1.25-lb. coke base box price 0.75 lb. 0.25 lb. add 55¢. Can-making quality BLACKPLATE 55 to 128 lb. deduct $2.20 from 1.25 lb. coke base box. * COKES: 1.50-lb. add 25¢. **ELECTRO: 0.50-lb. add 25¢; 0.75-lb. add 65¢; 1.00-lb. add $1.00. Differential 1.00 lb./0.25 lb. add 65¢.		Prices are for 50 lb. base box; for 45 lb. deduct 15¢; for 55 lb. add 15¢; for 60 lb. add 30¢.
	Claymont, Del.												
	Coatesville, Pa.												
	Conshohocken, Pa.	5.15 *A2*	6.325 *A2*					7.575 *A2*					
	Harrisburg, Pa.												
	Hartford, Conn.												
	Johnstown, Pa.									6.40 *B3*			
	Fairless, Pa.	5.15 *U1*	6.325 *U1*					7.575 *U1*	9.325 *U1*			$9.10 *U1*	$6.25 *U1*
	New Haven, Conn.												
	Phoenixville, Pa.												
	Sparrows Pt., Md.	5.10 *B3*	6.275 *B3*	6.875 *B3*		6.775 *B3*		7.525 *B3*	9.275 *B3* 10.025 *B3**	6.50 *B3*	$10.40 *B3*	$9.10 *B3*	$6.25 *B3*
	Worcester, Mass.									6.70 *A5*			
MIDDLE WEST	Alton, Ill.									6.60 *L1*			
	Ashland, Ky.	5.10 *A7*		6.875 *A7*		6.775 *A7*		7.525 *A7*			Hollowware Enameling 29 ga.—7.85 *U1* at Gary; Pittsburgh; *J3* at Aliquippa; *W5* at Yorkville; *Y1* at Indiana Harbor; *W5* at Wheeling; 7.95 *G2* at Granite City.		
	Canton-Massillon, Dover, Canfield, Ohio			6.875 *R1, R3*	7.50 *C19*								
	Chicago, Joliet, Ill.	5.10 *W8, A1*						7.525 *U1, W8*		6.40 *A5, R3, W8*			
	Sterling, Ill.									6.50 *N4, K2*			
	Cleveland, Ohio	5.10 *R3, J3*	6.275 *R3, J3*		7.65 *R3*	6.775 *R3*		7.525 *R3, J3*	9.275 *R3, J3*	6.40 *A5*			
	Detroit, Mich.	5.10 *G3, M2*	6.275 *G3, M2*					7.525 *G3*	9.275 *G3*				
	Newport, Ky.	5.10 *A9*	6.275 *A9*										
	Gary, Ind. Harbor, Indiana	5.10 *U1, I3, Y1*	6.275 *U1, I3, Y1*	6.875 *U1, I3*		6.775 *U1, I3, Y1*	7.225 *U1*	7.525 *U1, Y1, I3*	9.275 *U1, Y1*	6.40 *Y1*	$10.40 *U1, Y1*	$9.10 *I3, U1 Y1,*	$6.25 *U1, I3*
	Granite City, Ill.	5.20 *G2*	6.375 *G2*	6.975 *G2*								$9.20 *G2*	
	Kokomo, Ind.			6.975 *C9*						6.50 *C9*			
	Mansfield, Ohio	5.10 *E2*	6.275 *E2*				7.225 *E2*						
	Middletown, Ohio		6.275 *A7*	6.875 *A7*	7.225 *A7*	6.775 *A7*	7.225 *A7*						
	Niles, Warren, Ohio Sharon, Pa.	5.10 *R3, S1*	6.275 *R3*	6.875 *R3*	7.65 *R3*	6.775 *S1*	7.225 *S1†† R3*	7.525 *R3, S1*	9.275 *R3*			$9.10 *R3*	
	Pittsburgh, Midland, Butler, Aliquippa, McKeesport, Pa.	5.10 *U1, J3, P6*	6.275 *U1, J3, P6*	6.875 *U1, J3*	7.50 *E3*	6.775 *U1*		7.525 *U1, J3*	9.275 *U1, J3* 10.125 *U1, J3**	6.40 *A5, J3, P6*	$10.40 *U1, J3*	$9.10 *U1, J3*	$6.25 *U1, J3*
	Portsmouth, Ohio	5.10 *P7*	6.275 *P7*							6.40 *P7*			
	Weirton, Wheeling, Follansbee, W. Va.	5.10 *W3, W5*	6.275 *W3, F3, W5*	6.875 *W3, W5*	7.50 *W3*		7.225 *W3*	7.525 *W3*	9.275 *W3*		$10.40 *W5, W3*	$9.10 *W5, W3*	$6.40 *W5*** $6.25 *W3*
	Youngstown, Ohio	5.10 *U1, Y1*	6.275 *Y1*			6.775 *Y1*		7.525 *Y1*	9.275 *Y1*	6.40 *Y1*			
WEST	Fontana, Cal.	5.825 *K1*	7.40 *K1*					8.25 *K1*	10.40 *K1*		$11.05 *K1*	$9.75 *K1*	
	Geneva, Utah	5.20 *C7*											
	Kansas City, Mo.									6.65 *S2*			
	Los Angeles, Torrance, Cal.									7.20 *B2*			
	Minnequa, Colo.									6.65 *C6*			
	San Francisco, Niles, Pittsburg, Cal.	5.80 *C7*	7.225 *C7*	7.625 *C7*						7.20 *C7*	$11.05 *C7*	$9.75 *C7*	
SOUTH	Atlanta, Ga.												
	Fairfield, Ala. Alabama City, Ala.	5.10 *T2, R3*	6.275 *T2, R3*	6.875 *T2, R3*		6.775 *T2*				6.40 *T2, R3*	$10.40 *T2*	$9.10 *T2*	$6.25 *T2*
	Houston, Texas									6.65 *S2*			

* Hi Str. Low Alloy Galv. ** For 55 lb.; for 60 lb. add 15¢.

†† 7.425 at Sharon; Niles is 7.225.

(Effective Sept. 25, 1961)

IRON AGE

STEEL PRICES

Italics identify producers listed in key at end of table. Base prices, f.o.b. mill, in cents per lb., unless otherwise noted. Extras apply.

		BARS						PLATES				WIRE
		Carbon† Steel	Reinforcing	Cold Finished	Alloy Hot-rolled	Alloy Cold Drawn	Hi Str. H.R. Low Alloy	Carbon Steel	Floor Plate	Alloy	Hi Str. Low Alloy	Mfr's. Bright
EAST	Bethlehem, Pa.		Listing reinforcing bar prices has been suspended. Major producers now quote prices only in response to specific inquiries.		6.725 *B3*	9.025 *B3*	8.30 *B3*					
	Buffalo, N. Y.	5.675 *R3,B3, S15*		7.70 *B5*	6.725 *B3,R3, S15*	9.025 *B3,B5, S15*	8.30 *B3*	5.30 *B3*				8.00 *W6, S15*
	Claymont, Del.							5.30 *P2*	6.375 *P2*	7.50 *P2*	7.95 *P2*	
	Coatesville, Pa.							5.30 *L4*		7.50 *L4*	7.95 *L4*	
	Conshohocken, Pa.							5.30 *A2*	6.375 *A2*	7.50 *A2*	7.95 *A2*	
	Milton, Pa.	5.825 *M7*										
	Hartford, Conn.			8.15 *R3*		9.325 *R3*						
	Johnstown, Pa.	5.675 *B3*			6.725 *B3*		8.30 *B3*	5.30 *B3*		7.50 *B3*	7.95 *B3*	8.00 *B3*
	Steelton, Pa.											
	Fairless, Pa.	5.825 *U1*										
	Newark, Camden, N. J.			8.10 *W10, P10*		9.20 *W10, P10*						
	Bridgeport, Putnam, Willimantic, Conn.			8.20 *W10* 8.15 *J3*	6.80 *N8*	9.175 *N8*						
	Sparrows Pt., Md.							5.30 *B3*		7.50 *B3*	7.95 *B3*	8.10 *B3*
	Palmer, Worcester, Readville, Mansfield, Mass.			8.20 *B5, C14*		9.325 *A5, B5*						8.30 *A5, W6*
	Spring City, Pa.			8.10 *K4*		9.20 *K4*						
MIDDLE WEST	Alton, Ill.	5.875 *L1*										8.20 *L1*
	Ashland, Newport, Ky.							5.30 *A7, A9*		7.50 *A9*	7.95 *A7*	
	Canton, Massillon, Mansfield, Ohio	6.15* *R3*		7.65 *R3,R2*	6.725 *R3, T5*	9.025 *R3,R2, T5*		5.30 *E2*				
	Chicago, Joliet, Waukegan, Madison, Harvey, Ill.	5.675 *U1,R3, W8,N4,P13*		7.65 *A5, W10,W8, B5,L2,N9*	6.725 *U1,R3, W8*	9.025 *A5, W10,W8, L2,N8,B5*	8.30 *U1,W8, R3*	5.30 *U1,A1, W8,I3*	6.375 *U1*	7.50 *U1, W8*	7.95 *U1, W8*	8.00 *A5,R3, W8,N4, K2,W7*
	Cleveland, Elyria, Ohio	5.675 *R3*		7.65 *A5,C13, C18*		9.025 *A5, C13,C18*	8.30 *R3*	5.30 *R3,J3*	6.375 *J3*		7.95 *R3,J3*	8.00 *A5, C13,C18*
	Detroit, Plymouth, Mich.	5.675 *G3*		7.90 *P3* 7.85 *P8B5I12* 7.65 *R5*	6.725 *R5,G3*	9.025 *R5,P8 I12* 9.225 *B5,P3*	8.30 *G3*	5.30 *G3*		7.50 *G3*	7.95 *G3*	
	Duluth, Minn.											8.00 *A5*
	Gary, Ind. Harbor, Crawfordsville, Hammond, Ind.	5.675 *U1,I3, Y1*		7.65 *R3,J3*	6.725 *U1,I3, Y1*	9.025 *R3,M4*	8.30 *U1,Y1*	5.30 *U1,I3, Y1*	6.375 *J3, Y1*	7.50 *U1, Y1*	7.95 *U1, Y1,I3*	8.10 *M4*
	Granite City, Ill.							5.40 *G2*				
	Kokomo, Ind.											8.10 *C9*
	Sterling, Ill.	5.775 *N4*					7.925 *N4*	5.30 *N4*			7.625 *N4*	8.10 *K2*
	Niles, Warren, Ohio Sharon, Pa.			7.65 *C10*	6.725 *C10,*	9.025 *C10*		5.30 *R3,S1*		7.50 *S1*	7.95 *R3, S1*	
	Owensboro, Ky.	5.675 *G5*			6.725 *G5*							
	Pittsburgh, Midland, Donora, Aliquippa, Pa.	5.675 *U1,J3*		7.65 *A5,B4, R3,J3,C11, W10,S9,C8, M9*	6.725 *U1,J3, C11,B7*	9.025 *A5, W10,R3,S9, C11,C8,M9*	8.30 *U1,J3*	5.30 *U1,J3*	6.375 *U1,J3*	7.50 *U1, J3,B7*	7.95 *U1, J3,B7*	8.00 *A5, J3,P6*
	Portsmouth, Ohio											8.00 *P7*
	Youngstown, Steubenville, O.	5.675 *U1,R3, Y1*		7.65 *A1,Y1, F2*	6.725 *U1,Y1*	9.025 *Y1,F2*	8.30 *U1,Y1*	5.30 *U1,W5, R3,Y1*		7.50 *Y1*	7.95 *U1,Y1*	8.00 *Y1*
WEST	Emeryville, Fontana, Cal.	6.375 *K1*			7.775 *K1*		9.00 *K1*	6.10 *K1*		8.30 *K1*	8.75 *K1*	
	Geneva, Utah							5.30 *C7*			7.95 *C7*	
	Kansas City, Mo.	5.925 *S2*			6.975 *S2*		8.55 *S2*					8.25 *S2*
	Los Angeles, Torrance, Cal.	6.375 *C7,B2*		9.10 *R3,P14, S12*	7.775 *B2*	11.00 *P14, B5*	9.00 *B2*					8.95 *B2*
	Minnequa, Colo.	6.125 *C6*						6.15 *C6*				8.25 *C6*
	Portland, Ore.	6.425 *O2*										
	San Francisco, Niles, Pittsburg, Cal.	6.375 *C7* 6.425 *B2*					9.05 *B2*					8.95 *C7,C6*
	Seattle, Wash.	6.425 *B2,N6, A10*			7.825 *B2*		9.05 *B2*	6.20 *B2*		8.40 *B2*	8.85 *B2*	
SOUTH	Atlanta, Ga. Jacksonville, Fla.	5.875 *A8*										8.00 *A8* 8.35 *M4*
	Fairfield, Ala. Birmingham, Ala.	5.675 *T2,R3, C16*		8.10 *C16*			8.30 *T2*	5.30 *T2,R3*			7.95 *T2*	8.00 *T2,R3*
	Houston, Ft. Worth, Lone Star, Texas. Sand Springs, Okla.	5.925 *S2*			6.975 *S2*		8.55 *S2*	5.40 *S2*		7.60 *S2*	8.05 *S2*	8.25 *S2*

† Merchant Quality—Special Quality 35¢ higher.

(Effective Sept. 25, 1961)

* Special Quality.

STEEL PRICES

Key to Steel Producers

With Principal Offices

A1 Acme Steel Co., Chicago
A2 Alan Wood Steel Co., Conshohocken, Pa.
A3 Allegheny Ludlum Steel Corp., Pittsburgh
A4 American Cladmetals Co., Carnegie, Pa.
A5 American Steel & Wire Div., Cleveland
A6 Angel Nail & Chaplet Co., Cleveland
A7 Armco Steel Corp., Middletown, Ohio
A8 Atlantic Steel Co., Atlanta, Ga.
A9 Acme-Newport Steel Co., Newport, Ky.
A10 Alaska Steel Mills, Inc., Seattle, Wash.

B1 Babcock & Wilcox Tube Div., Beaver Falls, Pa.
B2 Bethlehem Steel Co., Pacific Coast Div.
B3 Bethlehem Steel Co., Bethlehem, Pa.
B4 Blair Strip Steel Co., New Castle, Pa.
B5 Bliss & Laughlin, Inc., Harvey, Ill.
B6 Brooke Plant, Wickwire-Spencer Steel Div., Birdsboro, Pa.
B7 A. M. Byers, Pittsburgh
B8 Braeburn Alloy Steel Corp., Braeburn, Pa.
B9 Barry Universal Corp., Detroit, Mich.

C1 Calstrip Steel Corp., Los Angeles
C2 Carpenter Steel Co., Reading, Pa.
C6 Colorado Fuel & Iron Corp., Denver
C7 Columbia Geneva Steel Div., San Francisco
C8 Columbia Steel & Shafting Co., Pittsburgh
C9 Continental Steel Corp., Kokomo, Ind.
C10 Copperweld Steel Co., Pittsburgh, Pa.
C11 Crucible Steel Co. of America, Pittsburgh
C13 Cuyahoga Steel & Wire Co., Cleveland
C14 Compressed Steel Shafting Co., Readville, Mass.
C15 G. O. Carlson, Inc., Thorndale, Pa.
C16 Connors Steel Div., Birmingham
C18 Cold Drawn Steel Plant, Western Automatic Machine Screw Co., Elyria, O.
C19 Canfield Steel Co., Canfield, O.

D1 Detroit Steel Corp., Detroit
D2 Driver, Wilbur B., Co., Newark, N. J.
D3 Driver Harris Co., Harrison, N. J.
D4 Dickson Weatherproof Nail Co., Evanston, Ill.

E1 Eastern Stainless Steel Corp., Baltimore
E2 Empire-Reeves Steel Corp., Mansfield, O.
E3 Enamel Products & Plating Co., McKeesport, Pa.

F1 Firth Sterling, Inc., McKeesport, Pa.
F2 Fitzsimons Steel Corp., Youngstown
F3 Follansbee Steel Corp., Follansbee, W. Va.

G2 Granite City Steel Co., Granite City, Ill.
G3 Great Lakes Steel Corp., Detroit
G4 Greer Steel Co., Dover, O.
G5 Green River Steel Corp., Owenboro, Ky.

H1 Hanna Furnace Corp., Detroit
H2 Hercules Drawn Steel Corp., Toledo, O.

I2 Ingersoll Steel Div., New Castle, Ind.
I3 Inland Steel Co., Chicago, Ill.
I4 Interlake Iron Corp., Cleveland

J1 Jackson Iron & Steel Co., Jackson, O.
J2 Jessop Steel Corp., Washington, Pa.
J3 Jones & Laughlin Steel Corp., Pittsburgh
J4 Joslyn Mfg. & Supply Co., Chicago
J5 Judson Steel Corp., Emeryville, Calif.

K1 Kaiser Steel Corp., Fontana, Calif.
K2 Keystone Steel & Wire Co., Peoria
K4 Keystone Drawn Steel Co., Spring City, Pa.

L1 Lackede Steel Co., St. Louis
L2 La Salle Steel Co., Chicago
L3 Lone Star Steel Co., Dallas
L4 Lukens Steel Co., Coatesville, Pa.

M1 Mahoning Valley Steel Co., Niles, O.
M2 McLouth Steel Corp., Detroit
M3 Mercer Tube & Mfg. Co., Sharon, Pa.
M4 Mid States Steel & Wire Co., Crawfordsville, Ind.
M7 Milton Steel Products Div., Milton, Pa.
M8 Mill Strip Products Co., Evanston, Ill.
M9 Moltrup Steel Products Co., Beaver Falls, Pa.
M10 Mill Strip Products Co., of Pa., New Castle, Pa.

N1 National Supply Co., Pittsburgh
N2 National Tube Div., Pittsburgh
N4 Northwestern Steel & Wire Co., Sterling, Ill.
N6 Northwest Steel Rolling Mills, Seattle
N7 Newman Crosby Steel Co., Pawtucket, R. I.
N8 Carpenter Steel of New England, Inc., Bridgeport, Conn.
N9 Nelson Steel & Wire Co.

O1 Oliver Iron & Steel Co., Pittsburgh
O2 Oregon Steel Mills, Portland

P1 Page Steel & Wire Div., Monessen, Pa.
P2 Phoenix Steel Corp., Phoenixville, Pa.
P3 Pilgrim Drawn Steel Div., Plymouth, Mich.
P4 Pittsburgh Coke & Chemical Co., Pittsburgh
P6 Pittsburgh Steel Co., Pittsburgh
P7 Portsmouth Div., Detroit Steel Corp., Detroit
P8 Plymouth Steel Co., Detroit
P9 Pacific States Steel Co., Niles, Cal.
P10 Precision Drawn Steel Co., Camden, N. J.
P11 Production Steel Strip Corp., Detroit
P13 Phoenix Mfg. Co., Joliet, Ill.
P14 Pacific Tube Co.
P15 Philadelphia Steel and Wire Corp.

R1 Reeves Steel & Mfg. Div., Dover, O.
R2 Reliance Div., Eaton Mfg. Co., Massillon, O.
R3 Republic Steel Corp., Cleveland
R4 Roebling Sons Co., John A., Trenton, N. J.
R5 Jones & Laughlin Steel Corp., Stainless and Strip Div.
R6 Rodney Metals, Inc., New Bedford, Mass.
R7 Rome Strip Steel Co., Rome, N. Y.

S1 Sharon Steel Corp., Sharon, Pa.
S2 Sheffield Steel Div., Kansas City
S3 Shenango Furnace Co., Pittsburgh
S4 Simonds Saw and Steel Co., Fitchburg, Mass.
S5 Sweet's Steel Co., Williamsport, Pa.
S7 Stanley Works, New Britain, Conn.
S8 Superior Drawn Steel Co., Monaca, Pa.
S9 Superior Steel Div. of Copperweld Steel Co.
S10 Seneca Steel Service, Buffalo
S11 Southern Electric Steel Co., Birmingham
S12 Sierra Drawn Div., Bliss & Laughlin, Inc., Los Angeles, Calif.
S13 Seymour Mfg. Co., Seymour, Conn.
S14 Screw and Bolt Corp. of America, Pittsburgh, Pa.
S15 Seaway Steel Div., Roblin-Seaway Ind., Inc., North Tonawanda, N. Y.

T1 Tonawanda Iron Div., N. Tonawanda, N. Y.
T2 Tennessee Coal & Iron Div., Fairfield
T3 Tennessee Products & Chem. Corp., Nashville
T4 Thomas Strip Div., Warren, O.
T5 Timken Steel & Tube Div., Canton, O.
T7 Texas Steel Co., Fort Worth
T8 Thompson Wire Co., Boston

U1 United States Steel Corp., Pittsburgh
U2 Universal Cyclops Steel Corp., Bridgeville, Pa.
U3 Ulbrich Stainless Steels, Wallingford, Conn.
U4 U. S. Pipe & Foundry Co., Birmingham

W1 Wallingford Steel Co., Wallingford, Conn.
W2 Washington Steel Corp., Washington, Pa.
W3 Weirton Steel Co., Weirton, W. Va.
W4 Wheatland Tube Co., Wheatland, Pa.
W5 Wheeling Steel Corp., Wheeling, W. Va.
W6 Wickwire Spencer Steel Div., Buffalo
W7 Wilson Steel & Wire Co., Chicago.
W8 Wisconsin Steel Div., S. Chicago, Ill.
W9 Woodward Iron Co., Woodward, Ala.
W10 Wyckoff Steel Co., Pittsburgh
W12 Wallace Barnes Steel Div., Bristol, Conn.

Y1 Youngstown Sheet & Tube Co., Youngstown, O.

STEEL SERVICE CENTER PRICES

Metropolitan Price, dollars per 100 lb.

Cities	City Delivery; Charge	Sheets			Strip	Plates	Shapes	Bars		Alloy Bars			
		Hot-Rolled (18 ga. & hvr.)	Cold-Rolled (15 gage)	Galvanized (10 gage)††	Hot-Rolled		Standard Structural	Hot-Rolled (merchant)	Cold-Finished	Hot-Rolled 4615 As rolled	Hot-Rolled 4140 Annealed	Cold-Drawn 4615 As rolled	Cold-Drawn 4140 Annealed
Atlanta		9.37	10.61	11.83	10.85	9.73	9.94	9.53	13.24	.....	.....	.....	.....
Baltimore	$.10	9.60	10.36	10.16	11.35	9.70	9.95	9.75	11.80	17.48	16.48	21.58	20.83
Birmingham		9.11	11.00	11.39	10.10	9.06	9.12	8.91	13.14	18.84	16.65	22.94	22.19
Boston**	.10	10.02	10.50	11.62	12.50	9.93	10.60	10.15	13.45	17.69	16.69	21.79	21.04
Buffalo**	.15	9.45	10.20	11.95	11.85	9.55	10.05	9.60	11.60	17.45	16.45	21.55	20.80
Chicago**	.15	9.37	10.35	10.28	11.54	9.21	9.72	9.37	10.80	17.10	16.10	21.20	20.45
Cincinnati**	.15	9.53	10.41	10.33	11.86	9.59	10.29	9.48	11.68	17.42	16.42	21.52	20.77
Cleveland**	.15	9.37[1]	10.81	11.07	11.66	9.45	10.11	9.48	11.40	17.21	16.21	21.31	20.56
Denver		11.55	12.53	13.03	13.72	11.39	11.90	11.55	12.98	.....	.....	.....	20.84
Detroit**	.15	9.63	10.61	10.65	11.91	9.58	10.29	9.68	11.16	17.38	16.38	21.48	20.73
Houston**		8.67	9.48	11.35[3]	10.23	8.00	8.31	8.08	13.10	17.50	16.55	21.55	20.85
Kansas City	.15	10.53	11.37	10.95	12.70	10.39	10.91	10.55	11.72	17.17	15.87	21.87	21.12
Los Angeles		10.35[1]	12.15	12.10	12.40	10.30	10.45	10.25	14.20	18.30	17.35	22.90	22.20
Memphis	.15	9.78	10.50	10.95	11.44	9.47	9.82	9.63	12.85	18.59	16.68	22.69	21.04
Milwaukee**	.15	9.51	10.49	10.42	11.68	9.35	9.94	9.51	11.04	17.24	16.24	21.34	20.59
New York**	.10	10.17	10.88	11.45	12.47	10.32	11.00	10.54	13.35	17.50	16.50	21.60	20.85
Norfolk	.20	8.20	.....	.....	8.90	8.65	9.20	8.90	10.70	.....	.....	.....	.....
Philadelphia	.10	9.60	10.10	10.76	11.35	9.70	9.95	9.75	12.05	17.48	16.48	21.58	20.83
Pittsburgh**	.15	9.37	10.68	11.83	11.64	9.21	9.72	9.37	11.40	17.10	16.10	21.20	20.45
Portland		10.40	12.25	12.35	12.40	10.55	11.00	10.40	16.65	18.60	17.85	22.70	22.15
San Francisco	.10	10.75	11.75[2]	11.85	12.80	10.90	11.20	10.65	15.20	18.30	17.35	22.90	22.20
Seattle		11.35	12.45	13.40	12.80	10.95	11.50	10.80	16.20	18.60	17.85	22.70	22.15
Spokane	.15	11.35	12.45	13.40	12.80	10.95	11.50	10.80	16.35	17.75	17.95	21.58	22.30
St. Louis**	.15	9.57	10.73	10.66	11.74	9.43	9.95	9.59	11.43	17.48	16.48	21.58	20.83
St. Paul	.15	8.97	9.64	10.79	11.14	8.81	9.32	8.97	11.64	.....	16.69	21.79	21.04

Base Quantities (Standard unless otherwise keyed): Cold finished bars: 2000 lb or over. Alloy bars: 1000 to 1999 lb. All others: 2000 to 4999 lb. All HR products may be combined for quantity. All galvanized sheets may be combined for quantity. CR sheets may be combined with each other for quantity. **These cities are on order quantity pricing. Prices shown are for 2000 lb item quantities of the following: Hot-rolled sheet—10 ga. x 36 x 96—120; Cold-rolled sheet—20 ga x 36 x 96—120; Galv. sheet—10 ga x 36—120; Hot-rolled strip—⅛" x 1"; Plate—¼" x 84"; Shapes—I-Beams 6 x 12.5; Hot-rolled bar—Rounds—⅝-2 15/16; Cold-finished bar—C 1018—1" rounds; Alloy bar—hot-rolled 4615—1⅛" to 2⅞"; cold drawn—15/16" to 2⅞" round; Hot-rolled 4140—⅝" to 2⅞" round, cold drawn—15/16" to 2⅞" round.

†† 13¢ zinc. ‡ Deduct for country delivery. [1] 15 ga. & heavier: [2] 14 ga. & lighter. [3] 10 ga. x 48 — 120.

(Effective Sept. 25, 1961)

PIG IRON

Dollars per gross ton, f.o.b., subject to switching charges.

Producing Point	Basic	Fdry.	Mall.	Bess.	Low Phos.
Birdsboro, Pa. *B6*	68.00	68.50	69.00	69.50	73.00
Birmingham *R3*	62.00	62.50*	66.50	.....	.....
Birmingham *W9*	62.00	62.50*	66.50	.....	.....
Birmingham *U4*	62.00	62.50*	66.50	.....	.....
Buffalo *R3*	66.00	66.50	67.00	67.50	.....
Buffalo *H1*	66.00	66.50	67.00	67.50	71.50†
Buffalo *W6*	66.00	66.50	67.00	67.50	.....
Chester *P2*	68.00	68.50	69.00	.....	.....
Chicago *I4*	66.00	66.50	66.50	67.00	71.00†
Cleveland *A5*	66.00	66.50	66.50	67.00	71.00†
Cleveland *R3*	66.00	66.50	66.50	67.00	.....
Duluth *I4*	66.00	66.50	66.50	67.00	71.00†
Erie *I4*	66.00	66.50	66.50	67.00	71.00†
Fontana *K1*	75.00	75.50	.....	.....	.....
Geneva, Utah *C7*	66.00	66.50	.....	.....	.....
Granite City *G2*	67.90	68.40	68.90	.....	.....
Hubbard *Y1*	.....	.....	66.50	.....	.....
Ironton, Utah *C7*	66.00	66.50	.....	.....	.....
Lyles, Tenn. *T3*	.....	.....	.....	.....	73.00
Midland *C11*	66.00	.....	.....	.....	.....
Minnequa *C6*	68.00	68.50	69.00	.....	.....
Monessen *P6*	66.00	.....	.....	.....	.....
Neville Is. *P4*	66.00	66.50	66.50	67.00	71.00†
N. Tonawanda *T1*	.....	66.50	67.00	67.50	.....
Rockwood *T3*	62.00	62.50	66.50	67.00	73.00
Sharpsville *S3*	66.00	.....	66.50	67.00	.....
So. Chicago *R3*	66.00	66.50	66.50	67.50	.....
So. Chicago *W8*	66.00	.....	66.50	67.00	.....
Swedeland *A2*	68.00	68.50	69.00	69.50	71.00†
Toledo *I4*	66.00	66.50	66.50	67.00	.....
Troy, N. Y. *R3*	68.00	68.50	69.00	69.50	73.00
Youngstown *Y1*	.....	.....	66.50	.....	.....

DIFFERENTIALS: Add, 75¢ per ton for each 0.25 pct silicon or portion thereof over base (1.75 to 2.25 pct except low phos., 1.75 to 2.00 pct) 50¢ per ton for each 0.25 pct manganese or portion thereof over 1 pct, $2 per ton for 0.50 to 0.75 pct nickel, $1 for each additional 0.25 pct nickel. Add $1.00 for 0.31-0.69 pct phos. Add 50¢ per gross ton for truck loading charge.

Silvery Iron: Buffalo (6 pct), *H1*, $79.25; Jackson *J1, I4*, Toledo, *I4*, $78.00; Niagara Falls (15.01-15.50), $101.00; Keokuk (14.01-14.50), $89.00; (15.51-16.00), $92.00. Add 75¢ per ton for each 0.50 pct silicon over base (6.01 to 6.50 pct) up to 13 pct; 13 to 13.5 pct; 13.5 to 14 pct, add $1. Add $1.00 for each 0.50 pct manganese over 1.00 pct.

† Intermediate low phos.

FASTENERS

(Base discounts, f.o.b. mill, based on latest list prices)

Hex Screws and All Bolts Including Hex & Hex, Square Machine, Carriage, Lag, Plow, Step, and Elevator

(Discount for 1 container) — Pct

Plain finish—packaged and bulk	43
Hot galvanized and zinc plated—packaged	39.25
Hot galvanized and zinc plated—bulk	43

Nuts: Hexagon and Square, Hex, Heavy Hex, Thick Hex & Square

(Discount for 1 container) — Pct

Plain finish—packaged and bulk	43
Hot galvanized and zinc plated—packaged	39.25
Hot galvanized and zinc plated—bulk	43

Hexagon Head Cap Screws—UNC or UNF Thread—Bright & High Carbon

(Discount for 1 container)

Plain finish—packaged and bulk	43
Hot galvanized and zinc plated—packaged	39.25
Hot galvanized and zinc plated—bulk	43

(Minimum plating charge — $10.00 per item. Price on application assembled to bolts.)

Machine Screws and Stove Bolts

(Packages—plain finish)

	Discount Screws	Bolts
Full Cartons	46	46
Machine Screws—bulk		
¼ in. diam or smaller	25,000 pcs	50
5/16, ⅜ & ½ in. diam	15,000 pcs	50

STAINLESS STEEL

Base price cents per lb. f.o.b. mill

Product	201	202	301	302	303	304	316	321	347	403	410	416	430
Ingots, reroll.	22.75	24.75	24.00	26.25	—	28.00	41.25	33.50	38.50	—	17.50	—	17.75
Slabs, billets	25.00	28.25	26.00	29.50	32.00	29.50	47.50	38.00	46.50	—	19.25–21.50	—	19.75–21.75
Billets, forging	—	37.75	38.75	39.50	42.50	39.50	64.50	48.75	57.75	26.75	29.25–26.75	29.75	29.75
Bars, struct.	43.50	44.50	46.00	46.75	49.75	46.75	75.75	57.50	67.25	31.50	35.00–31.50	35.50	35.50
Plates	39.25	40.00	41.25	42.25	45.00	42.25	71.75	54.75	64.75	30.00	30.00	31.25–31.75	31.00
Sheets	48.50	49.25	51.25	52.00	56.75	52.00	80.75	65.50	79.25	40.25	40.25	48.25	40.75
Strip, hot-rolled	36.00	39.00	37.25	40.50	—	40.50	68.50	53.50	63.50	—	31.00	—	32.00
Strip, cold-rolled	43.50	46.75	45.00	49.50	56.75	49.50	76.75	62.25	75.25	40.25	40.25	42.50	38.75
Wire CF; Rod HR	—	42.25	43.50	44.25	47.25	44.25	71.75	54.50	63.75	29.75	33.25–29.75	33.75	33.75

STAINLESS STEEL PRODUCING POINTS:

Sheets: Midland, Pa., *C11;* Brackenridge, Pa., *A3;* Butler, Pa., *A7;* Vandergrift, Pa., *U1;* Washington, Pa., *W2, J2;* Baltimore, *E1;* Middletown, O., *A7;* Massillon, O., *R3;* Gary, *U1;* Bridgeville, Pa., *U2;* New Castle, Ind., *I2;* Detroit, *M2;* Louisville, O., *R5.*

Strip: Midland, Pa., *C11;* Waukegan, Cleveland, *A5;* Carnegie, Pa., *S9;* McKeesport, Pa., *F1;* Reading, Pa., *C2;* Washington, Pa., *W2;* W. Leechburg, Pa., *A3;* Bridgeville Pa., *U2;* Detroit, *M2;* Detroit, *S1;* Canton, Massillon, O., *R3;* Harrison, N. J., *D3;* Youngstown, *R5;* Sharon, Pa., *S1;* Butler, Pa., *A7,* Wallingford, Conn., *U3* (plus further conversion extras); *W1* (25¢ per lb. higher); Seymour, Conn., *S13,* (25¢ per lb. higher); New Bedford, Mass., *R6;* Gary, *U1,* (25¢ per lb. higher); Baltimore, Md., *E1* (300 series only).

Bar: Baltimore, *A7;* S. Duquesne, Pa., *U1;* Munhall, Pa., *U1;* Reading, Pa., *C2;* Titusville, Pa., *U2;* Washington, Pa., *J2;* McKeesport, Pa., *U1, F1;* Bridgeville, Pa., *U2;* Dunkirk, N. Y., *A3;* Massillon, O., *R5;* S. Chicago, *U1;* Syracuse, N. Y., *C11;* Watervliet, N. Y., *A3;* Waukegan, *A5;* Canton, O., *T5, R3;* Ft. Wayne, *I4;* Detroit, *R5;* Gary, *U1;* Owensboro, Ky., *G5;* Bridgeport, Conn., *N8;* Ambridge, Pa., *B7.*

Wire: Waukegan, *A5;* Massillon, O., *R3;* McKeesport, Pa., *F1;* Ft. Wayne, *J4;* Newark, N. J. *D2;* Harrison, N. J., *D3;* Baltimore, *A7;* Dunkirk, *A3;* Monessen, *P1;* Syracuse, *C11;* Bridgeville, *U2;* Detroit, *R5;* Reading, Pa., *C2;* Bridgeport, Conn., *N8* (down to and including ¼").

Structurals: Baltimore, *A7;* Massillon, O., *R3;* Chicago, Ill., *J4;* Watervliet, N. Y., *A3;* Syracuse, *C11;* S. Chicago, *U1.*

Plates: Ambridge, Pa., *B7;* Baltimore, *E1;* Brackenridge, Pa., *A3;* Chicago, *U1;* Munhall, Pa., *U1;* Midland, Pa., *C11;* New Castle, Ind., *I2;* Middletown, *A7;* Washington, Pa., *J2;* Cleveland, Massillon, *R3;* Coatesville, Pa., *C15;* Vandergrift, Pa., *U1;* Gary, *U1:* Claymont, Del; *P2.*

Forging billets: Ambridge Pa., *B7;* Midland, Pa., *C11;* Baltimore, *A7;* Washington, Pa., *J2;* McKeesport, *F1;* Massillon, Canton, O., *R3;* Watervliet, *A3;* Pittsburgh, Chicago, *U1;* Syracuse, *C11;* Detroit, *R5;* Munhall, Pa., S. Chicago, *U1;* Owensboro, Ky., *G5;* Bridgeport, Conn., *N8;* Reading, Pa., *C2.*

Machine Screw and Stove Bolt Nuts

(Packages—plain finish)

	Discount Hex	Square
Full Cartons	46	57
Bulk		
¼ in. diam or smaller	25,000 pcs	
5/16 or ⅜ in. diam	56	60
	15,000 pcs	
	56	60

Rivets

	Base per 100 lb
½ in. diam and larger	$12.85
	Pct Off List
7/16 in. and smaller	15

NOTE: Ferroalloy prices are published in alternate issues.

TOOL STEEL

F.o.b. mill

W	Cr	V	Mo	Co	per lb	AISI
18	4	1	—	—	$1.84	T-1
18	4	1	—	5	2.545	T-4
18	4	2	—	—	2.005	T-2
1.5	4	1.5	8	—	1.20	M-1
6	4	3	6	—	1.59	M-3
6	4	2	5	—	1.345	M-2
High-carbon chromium					.955	D-3, D-5
Oil hardened manganese					.505	O-2
Special carbon					.38	W-1
Extra carbon					.38	W-1
Regular carbon					.325	W-1

Warehouse prices on and east of Mississippi are 4¢ per lb higher. West of Mississippi, 6¢ higher.

LAKE SUPERIOR ORES

51.50% Fe natural, delivered lower Lake ports. Interim prices for 1960 season. Freight changes for seller's account.

	Gross Ton
Openhearth lump	$12.70
Old range, bessemer	11.85
Old range, nonbessemer	11.70
Mesabi, bessemer	11.60
Mesabi, nonbessemer	11.45
High phosphorus	11.45

(Effective Sept. 25, 1961)

MERCHANT WIRE PRODUCTS

F.o.b. Mill	Standard & Coated Nails	Woven Wire Fence	"T" Fence Posts	Single Loop Bale Ties	Galv. Barbed and Twisted Barbless Wire	Merch. Wire Ann'ld	Merch. Wire Galv.
	Col	Col	Col	Col	Col	¢/lb.	¢/lb.
Alabama City *R3*	173	187	...	212	193	9.00	9.55
Aliquippa *J3***	173	190	...	...	190	9.00	9.675
Atlanta *A8***	173	191	...	212	197	9.00	9.75
Bartonville *K2***	175	193	183	214	199	9.10	9.85
Buffalo *W6*	.....	.....	...	...	.....	9.00	9.55*
Chicago *N4*	173	191	177	212	197	9.00	9.75
Chicago *R3*	.....	.....	...	...	.....	9.00	9.55
Chicago *W7*	173	.....	...	...	.....	9.00	9.55†
Cleveland *A6*	.....	.....	...	...	.....	.....	.....
Cleveland *A5*	.....	.....	...	...	.....	9.00	.....
Crawf'dav. *M4***	175	192	...	214	198	9.10	9.80
Donora Pa. *A5*	173	187	...	212	193	9.00	9.55
Duluth *A5*	173	187	177	212	193	9.00	9.55
Fairfield, Ala. *T2*	173	187	...	212	193	9.00	9.55
Galveston *D4*	9.10‡	.....	...	...	.....	.....	.....
Houston *S2'*	178	192	...	217	198	9.25	9.80†
Jacksonville *M4*	175	192	...	214	198	9.10	9.80††
Johnstown *B3***	173	190	177	...	196	9.00	9.675
Joliet Ill. *A5*	173	187	...	212	193	9.00	9.55
Kokomo *C9**	175	189	...	214	195*	9.10	9.65*
L. Angeles *B2****	.....	.....	...	...	.....	9.95	10.625
Kansas City *S2**	178	192	...	217	198*	9.25	9.80†
Minnequa *C6*	178	192	182	217	198†	9.25	9.80†
Palmer, Mass. *W6*	.....	.....	...	...	.....	9.30	9.85*
Pittsburg, Cal. *C7*	192	210	...	...	213	9.95	10.50
Rankin Pa. *A5*	173	187	...	...	193	9.00	9.55
So. Chicago *R3*	173	187	...	...	193	8.65	9.20
S. San Fran. *C6*	.....	.....	...	236	.....	9.95	10.50
Sparrows Pt. *B3***	175	.....	...	215	198	9.10	9.775
Struthers, O. *Y1**	.....	.....	...	...	.....	8.65	9.20
Worcester *A5*	179	.....	...	...	.....	9.30	9.85
Williamsport *S5*	.....	.....	...	...	.....	.....	.....

* Zinc less than .10¢. *** .10¢ zinc.
** 13-13.5¢ zinc. † Plus zinc extras.
‡ Wholesalers only. †† 0.115¢ zinc.

PIPE AND TUBING

Base discounts (pct) f.o.b. mills. Base price about $200 per net ton.

STANDARD T. & C.	BUTTWELD														SEAMLESS							
	½ In.		¾ In.		1 In.		1¼ In.		1½ In.		2 In.		2½–3 In.		2 In.		2½ In.		3 In.		3½–4 In.	
	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.
Sparrows Pt. *B3*	0.25	*15.0	3.25	*11.0	6.75	*6.50	9.25	*5.75	9.75	*4.75	10.25	*4.25	11.75	*4.50								
Youngstown *R3*	2.25	*13.0	5.25	*9.0	8.75	*4.50	11.25	*3.75	11.75	*2.75	12.25	*2.25	13.75	*2.50								
Fontana *K1*	*10.75	*26.00	*7.75	*22.00	*4.25	*17.50	*1.75	*16.75	*1.25	*15.75	*0.75	*15.25	0.75	*15.50								
Pittsburgh *J3*	2.25	*13.0	5.25	*9.0	8.75	*4.50	11.25	*3.75	11.75	*2.75	12.25	*2.25	13.75	*2.50	*12.25	*27.25	*5.75	*22.50	*3.25	*20.0	*1.75	*18.50
Alton, Ill. *L1*	0.25	*15.0	3.25	*11.0	6.75	*6.50	9.25	*5.75	9.75	*4.75	10.25	*4.25	11.75	*4.50								
Sharon *M3*	2.25	*13.0	5.25	*9.0	8.75	*4.50	11.25	*3.75	11.75	*2.75	12.25	*2.25	13.75	*2.50								
Fairless *N2*	0.25	*15.0	3.25	*11.0	6.75	*6.50	9.25	*5.75	9.75	*4.75	10.25	*4.25	11.75	*4.50								
Pittsburgh *N1*	2.25	*13.0	5.25	*9.0	8.75	*4.50	11.25	*3.75	11.75	*2.75	12.25	*2.25	13.75	*2.50	*12.25	*27.25	*5.75	*22.50	*3.25	*20.0	*1.75	*18.50
Wheeling *W5*	2.25	*13.0	5.25	*9.0	8.75	*4.50	11.25	*3.75	11.75	*2.75	12.25	*2.25	13.75	*2.50								
Wheatland *W4*	2.25	*13.0	5.25	*9.0	8.75	*4.50	11.25	*3.75	11.75	*2.75	12.25	*2.25	13.75	*2.50								
Youngstown *Y1*	2.25	*13.0	5.25	*9.0	8.75	*4.50	11.25	*3.75	11.75	*2.75	12.25	*2.25	13.75	*2.50	*12.25	*27.25	*5.75	*22.50	*3.25	*20.0	*1.75	*18.50
Indiana Harbor *Y1*	1.25	*14.0	4.25	*10.0	7.75	*5.50	10.25	*4.75	10.75	*3.75	11.25	*3.25	12.75	*3.50								
Lorain *N2*	2.25	*13.0	5.25	*9.0	8.75	*4.50	11.25	*3.75	11.75	*2.75	12.25	*2.25	13.75	*2.50	*12.25	*27.25	*5.75	*22.50	*3.25	*20.0	*1.75	*18.50
EXTRA STRONG PLAIN ENDS																						
Sparrows Pt. *B3*	4.75	*9.0	8.75	*5.0	11.75	*0.50	12.25	*1.75	12.75	*0.75	13.25	*0.25	13.75	*1.50								
Youngstown *R3*	6.75	*7.0	10.75	*3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50								
Fairless *N2*	4.75	*9.0	8.75	*5.0	11.75	*0.50	12.25	*1.75	12.75	*0.75	13.25	*0.25	13.75	*1.50								
Fontana *K1*	*6.25		*2.25		0.75		1.25		1.75		2.25		2.75									
Pittsburgh *J3*	6.75	*7.0	10.75	*3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50	*10.75	*24.75	*3.25	*19.0	*0.75	*16.50	4.25	*11.50
Alton, Ill. *L1*	4.75	*9.0	8.75	*5.0	11.75	*0.50	12.25	*1.75	12.75	*0.75	13.25	*0.25	13.75	*1.50								
Sharon *M3*	6.75	*7.0	10.75	*3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50								
Pittsburgh *N1*	6.75	*7.0	10.75	*3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50	*10.75	*24.75	*3.25	*19.0	*0.75	*16.50	4.25	*11.50
Wheeling *W5*	6.75	*7.0	10.75	*3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50								
Wheatland *W4*	6.75	*7.0	10.75	*3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50								
Youngstown *Y1*	6.75	*7.0	10.75	*3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50	*10.75	*24.75	*3.25	*19.0	*0.75	*16.50	4.25	*11.50
Indiana Harbor *Y1*	5.75	*8.0	9.75	*4.0	12.75	0.50	13.25	*0.75	13.75	0.25	14.25	0.75	14.75	*0.50								
Lorain *N2*	6.75	*7.0	10.75	*3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50	*10.75	*24.75	*3.25	*19.0	*0.75	*16.50	4.25	*11.50

Threads only, buttweld and seamless, 2¼ pt. higher discount. Plain ends, buttweld and seamless, 3-in. and under, 5½ pt. higher discount.
Galvanized discounts based on zinc price range of over 9¢ to 11¢ per lb. East St. Louis. For each 2¢ change in zinc, discounts vary as follows: ½, ¾ and 1-in., 2 pt.; 1¼, 1½ and 2-in., 1½ pt.; 2½ and 3-in., 1 pt., e.g., zinc price range of over 13¢ to 15¢ would lower discounts on 2½ and 3-in. pipe by 2 points; zinc price in range over 7¢ to 9¢ would increase discounts. East St. Louis zinc price now 11.50¢ per lb.

CAST IRON WATER PIPE INDEX

Birmingham	125.8
New York	138.6
Chicago	140.0
San Francisco-L. A.	148.6

Dec. 1955, value, Class B or heavier 6 in. or larger, bell and spigot pipe. Explanation: p. 57, Sept. 1, 1955, issue. Source: U. S. Pipe and Foundry Co.

COKE

Furnace, beehive (f.o.b.)	Net-Ton
Connellsville, Pa.	$14.75 to $15.50
Foundry, beehive (f.o.b.)	$18.50
Foundry oven coke	
Buffalo, del'd	$33.25
Chattanooga, Tenn.	30.80
Ironton, O., f.o.b.	30.50
Detroit, f.o.b.	32.00
New Haven, f.o.b.	31.00
Kearny, N. J., f.o.b.	31.25
Philadelphia, f.o.b.	31.00
Swedeland, Pa., f.o.b.	31.00
Painesville, Ohio, f.o.b.	32.00
Erie, Pa., f.o.b.	32.00
St. Paul, f.o.b.	31.25
St Louis, f.o.b.	33.00
Birmingham, f.o.b.	30.35
Milwaukee, f.o.b.	32.00
Neville Is., Pa.	30.75

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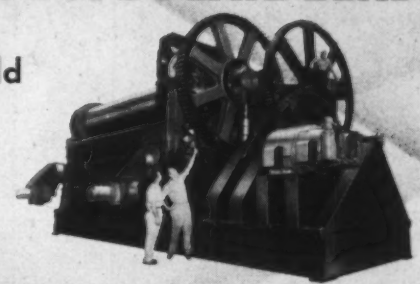
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FERROALLOY PRICES

NOTE: Prices of Boiler Tubes, Clad Steel, C-R Spring Steel, Electrical Sheets, Electrodes, Electroplating Supplies, Metal Powders, Rails and Track Supplies, and Refractories are published in alternate issues.

Ferrochrome

Cents per lb contained Cr, lump, bulk, carloads, del'd. 65-71% Cr, .30-1.00% max. Si.

0.02% C....	41.00	0.50% C....	33.25
0.05% C....	34.00	1.00% C....	33.00
0.10% C....	33.75	1.50% C....	32.75
0.20% C....	33.50	2.00% C....	32.50

3-5% C, 53-63% Cr, 2.5% max. Si... 26.00
4-6% C, 58-63% Cr, 3-6% Si..... 22.50
5-8% C, 58-63% Cr, 3-6% Si..... 22.50
6-8% C, 50-56% Cr, 4-7% Si..... 22.00
4.00-4.50% C, 60-70% Cr, 1.2% Si.. 28.75
0.025% C (Simplex) 31.50
0.010% C max, 63-66% Cr, 5-7% Si. 32.50
0.010% C max, 68-71% Cr, 2% Si max 31.50
0.25% C max 33.50

High Nitrogen Ferrochrome

Low-carbon type 0.75% N. Add 5¢ per lb to regular low carbon ferrochrome max. 0.10% C price schedule.

Chromium Metal

Per lb chromium, contained, packed delivered, ton lots, 97.25% min. Cr, 1% max. Fe.

0.10% max. C $1.29
9 to 11% C, 88-91% Cr, 0.75% Fe... 1.38

Electrolytic Chromium Metal

Per lb of metal 2" x D plate (⅛" thick) delivered packed, 99.80% min. Cr. (Metallic Base) Fe 0.20 max.

Carloads $1.15
Ton lots 1.17
Less ton lots 1.19

Low Carbon Ferrochrome Silicon

(Cr 39-41%, Si 42-45%, C 0.05% max.) Carloads, delivered, lump, 3-in x down, packed.

Price is sum of contained Cr and contained Si.

	Cr	Si
Carloads, bulk	22.50	14.60
Ton lots	30.45	16.05
Less ton lots	33.40	17.70

Calcium-Silicon

Per lb of alloy, lump, delivered, packed. 30-33% Cr, 60-65% Si, 3.00 max. Fe.

Carloads, bulk 24.00
Ton lots 27.95
Less ton lots 29.45

Calcium-Maganese—Silicon

Cents per lb of alloy, lump, delivered, packed.

16-20% Ca, 14-18% Mn, 53-59% Si.

Carloads, bulk 23.00
Ton lots 26.15
Less ton lots 27.15

SMZ

Cents per pound of alloy, delivered, 60-65% Si, 5-7% Mn, 5-7% Zr, 20% Fe ½ in. x 12 mesh.

Ton lots 21.15
Less ton lots 22.40

V Foundry Alloy

Cents per pound of alloy, f.o.b. Suspension Bridge, N. Y., freight allowed max. St. Louis, V-5: 38-42% Cr, 17-19% Si, 8-11% Mn, packed.

Carload lots 18.45
Ton lots 19.95
Less ton lots 21.20

Graphidox No. 4

Cents per pound of alloy, f.o.b. Suspension Bridge, N. Y., freight allowed, max. St. Louis, Si 48 to 52%, Ti 9 to 11%, Ca 5 to 7%.

Carload bulk 19.20
Ton lots to carload packed 21.15
Less ton lots 22.40

Ferromanganese

Maximum base price, f.o.b., lump size, base content 74 to 76 pct Mn. Carload lots, bulk.

Producing Point	Cents per-lb
Marietta, Ashtabula, O.; Alloy, W. Va.; Sheffield, Ala.; Portland, Ore.	11.00
Houston, Tex.	11.00
Johnstown, Pa.	11.00
Lynchburg, Va.	11.00
Neville Island, Pa.	11.00
Sheridan, Pa.	11.00
Philo, Ohio	11.00
Rockwood, Tenn.	11.00
S. Duquesne	11.00

Add or substract 0.1¢ for each 1 pct Mn above or below base content.

Briquets, delivered, 66 pct Mn:

Carloads, bulk 13.70
Ton lots packed in bags 16.10

Spiegeleisen

Per gross ton, lump, f.o.b., 3% Si max.

Mn	Palmerton, Pa. 10 lb, pig	35 lb, down	Neville Is., Pa. 35 lb
16-19%	.. $98.00	$96.00	$100.50
19-21%	.. 100.00	98.00	102.50
21-23%	.. 102.50	100.00	105.50

Manganese Metal

2 in. x down, cents per pound of metal delivered.

95.50% min. Mn, 0.2% max. C, 1% max. Si, 2.5% max. Fe.

Carload, packed 45.75
Ton lots 47.25

Electrolytic Manganese

F.o.b. Knoxville, Tenn., freight allowed east of Mississippi, f.o.b. Marietta, O., delivered, cents per pound.

Carloads, bulk 34.25
Ton lots, palletized 36.25
250 to 1999 lb 39.00
Premium for Hydrogen - removed metal 0.75

Medium Carbon Ferromanganese

Mn 80 to 85%, C 1.25 to 1.50, Si 1.50% max., carloads, lump, bulk, delivered, per lb of contained Mn 24.00

Low-Carb Ferromanganese

Cents per pound Mn contained, lump size, packed, del'd Mn 85-90%.

	Carloads	Ton	Less
0.07% max. C, 0.06% P, 90% Mn	(Bulk) 37.15	39.95	41.15
0.07% max. C	35.10	37.90	39.10
0.10% max. C	34.35	37.15	38.35
0.15% max. C	31.10	33.90	35.10
0.30% max. C	29.80	32.60	33.80
0.50% max. C	28.50	31.30	32.50
0.75% max. C, 80.85% Mn, 5.0-7.0% Si ...	27.00	29.80	31.00

Silicomanganese

Lump size, cents per pound of metal, 65-68% Mn, 18-20% Si, 1.5% max. C for 2% max. C, deduct 0.3¢ f.o.b. shipping point.

Carloads bulk 11.60
Ton lots, packed 13.25
Carloads, bulk, delivered, per lb of briquet 14.00
Briquets, packed pallets, 2000 lb up to carloads 16.40

Silvery Iron (electric furnace)

Si 15.50 to 16.00 pct., f.o.b. Keokuk, Iowa, or Wenatchee, Wash., $106.50 gross ton, frieght allowed to normal trade area. Si 15.01 to 15.50 pct, f.o.b. Niagara Falls, N. Y., $93.00.

Silicon Metal

Cents per pound contained Si, lump size, delivered, packed.

	Ton lots,	Carloads,
98.25% Si, 0.50% Fe ..	22.95	21.65
98% Si, 1.0% Fe	21.95	20.65

Silicon Briquets

Cents per pound of briquets, bulk, delivered, 40% Si, 2 lb Si, briquets.

Carloads, bulk 8.00
Ton lots, packed 10.80

Electric Ferrosilicon

Cents per lb contained Si, lump, bulk, carloads, f.o.b. shipping point.

50% Si....	13.50	75% Si....	16.90
65% Si....	15.75	85% Si....	18.60
	90% Si....	20.00	

Ferrovanadium

50-55% V delivered, per pound, contained V, in any quantity.

Openhearth 3.20
Crucible 3.30
High speed steel 3.40

Calcium Metal

Eastern zone, cents per pound of metal, delivered.

	Cast	Turnings	Distilled
Ton lots	$2.05	$2.95	$3.75
100 to 1999 lb...	2.40	3.30	4.55

Alsifer, 20% Al, 40% Si, 40% Fe, f.o.b. Suspension Bridge, N. Y. per lb.

Carloads, bulk ..... 9.85¢
Ton lots ..... 11.20¢

Calcium molybdate, 43.6-46.6% f.o.b. Langeloth, Pa., per pound contained Mo $1.63

Ferrocolumbium, 58-62% Cb, 2 in. x D, del'd per lb con't Cb

Ton lots $3.45
Less ton lots 3.50

Ferro-tantalum-columbium, 20% Ta, 40% Cb, 0.30% C, del'd ton lots, 2-in. x D per lb con't Cb plus Ta $3.40

Ferromolybdenum, 55-75%, 200-lb containers, f.o.b. Langeloth, Pa., per pound contained Mo.. $1.89

Ferrophosphorus, electric, 23-26%, car lots, f.o.b. Siglo, Mt. Pleasant, Tenn., $5.00 unitage, per gross ton $120.00
10 tons to less carload $131.00

Ferrotitanium, 40% regular grade 0.10% C max., f.o.b. Vanadis, O., O., freight allowed, ton lots, per lb contained Ti $1.35
Less ton lots (200 lb and up) $1.37

Ferrotitanium, 30% low carbon, 0.10% C max., 27-32% Ti, Vanadis, O., freight allowed, per lb contained Ti, ton lots $1.35
Less ton lots (200 lb and up) $1.40

Ferrotitanium, 1-3% Carbon, 17-20% Ti, f.o.b. shipping point, freight allowed, carload per net ton $250.00
Ton lots $260.00

Ferrotungsten, ¼ x down packed per pounds contained W, ton lots delivered ..... $2.45 (nominal)

Molybdic oxide, briquets per lb. contained Mo, f.o.b. Langeloth, Pa. $1.62
bags, f.o.b. Washington, Pa., Langeloth, Pa. $1.59

Simanal, 20% Si, 20% Mn, 20% Al, f.o.b. Philo, Ohio, freight allowed per lb.

Carload, bulk lump ..... 18.50¢
Ton lots, packed lump ..... 20.50¢
Less ton lots ..... 21.00¢

Vanadium oxide, 86-89% V_2O_5 per pound contained V_2O_5 .... $1.38

Zirconium silicon, per lb of alloy 35-40% del'd, carloads, bulk.. 26.25¢
12-15%, del'd lump, bulk-carloads ..... 9.25¢

Boron Agents

Borosil, per lb of alloy del. f.o.b. Philo, Ohio, freight allowed, B 3-4%, Si 40-45%, per lb contained B

2000 lb carload $5.50

Ferro Zirconium Boron, Zr 50% to 60%, B 0.8% to 1.0%, Si 8% max., C 8% max., Fe balance, f.o.b. Niagara Falls, New York, freight allowed, in any quantity per pound ..... 30¢

Corbortam, Ti 15-21%, B 1-2%, Si 2-4%, Al 1-2%, C 4-5-7.5%, f.o.b., Suspension Bridge, N. Y., freight allowed.

Ton lots per pound ..... 18.25¢

Ferroboron, 17.50 min. B, 1.50% max. Si, 0.50% max. Al, 0.50% max. C, 1 in. x D, ton lots... $1.20
F.o.b. Wash., Pa., Niagara Falls, N. Y., delivered 100 lb up
10 to 14% B ..... .85
14 to 19% 1.20
19% min. B 1.50

Grainal, f.o.b. Cambridge, O., freight, allowed, 100 lb & over

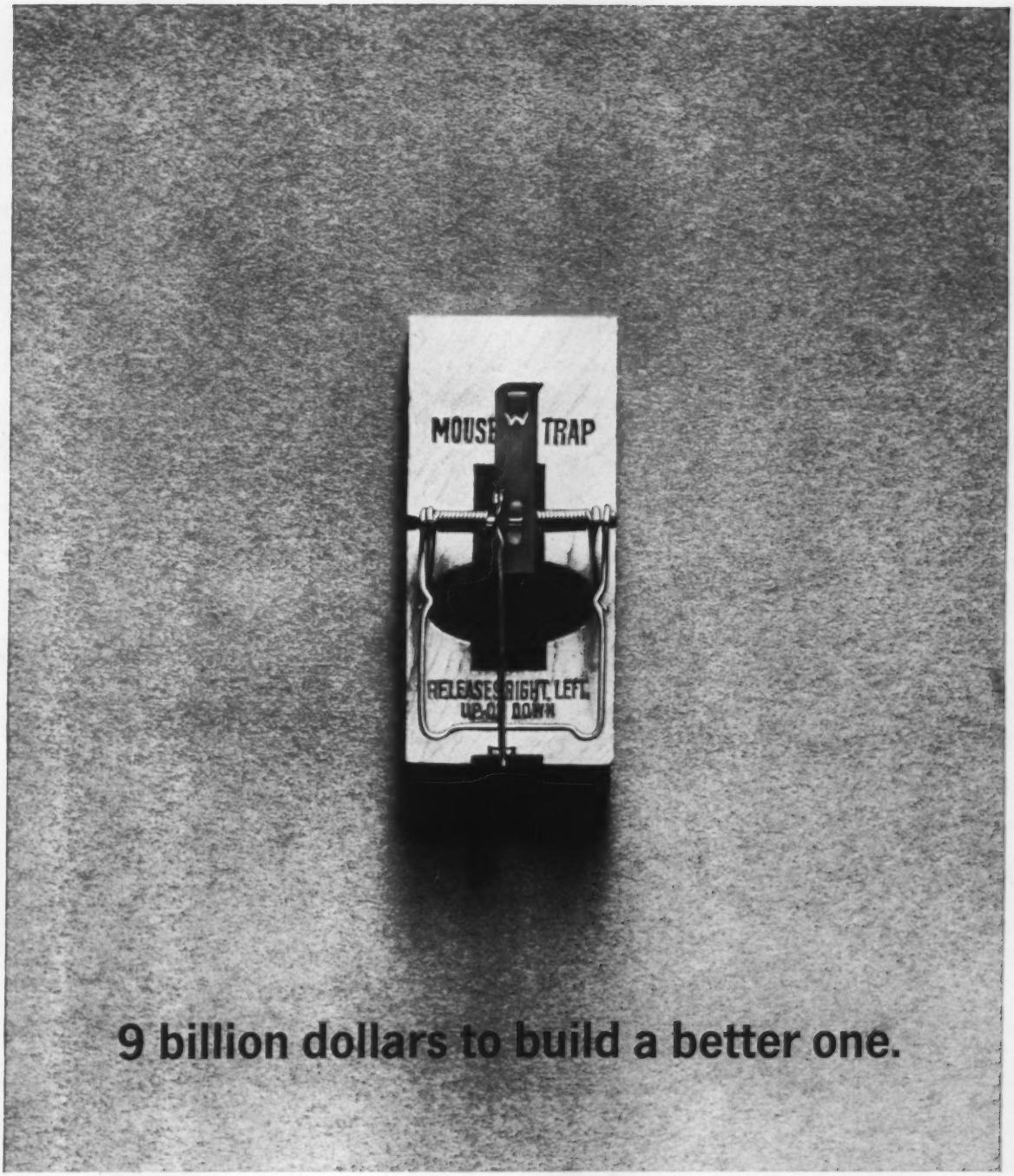
No. 1 ..... $1.05
No. 79 ..... 50¢

Manganese-Boron, 75.00% Mn, 17.50% B, 5% max. Fe, 1.50% max. Si, 3.00% max. C, 2 in. x D, del'd

Ton lots (packed) $1.46
Less ton lots (packed) 1.57

Nickel-Boron, 15-18% B, 1.00% max. Al, 1.50% max. Si, 0.50% max. C, 3.00% max. Fe, balance Ni, del'd less ton lots 2.15

(Effective Sept. 25, 1961)



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We're living in a needing, buying, growing America—a time for new and improved products and services—the creation of new jobs. More than ever, a businessman with an idea, with the urge for something better will move ahead with our expanding economy.

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How a "specially tailored" strip reduces production rejects almost 25% for Kromex

Kromex, Inc., Cleveland, Ohio, turns out a complete line of pantry ware, but they were having trouble with a square, mirror-finish chromium-plated cake cover that was made with a single deep draw. Rejection rate was a stunning 25%. They first tried a No. 3 finish for this application, but because of the very deep draw and the dense and smooth surface, satisfactory lubrication was near impossible. The result: Excessive draw marks and breakage. A regular No. 2 finish was then tried. The draw was successful. But buffing and finishing costs were prohibitive for this application.

American Steel and Wire salesmen conferred with our Metallurgical Department and suggested a specially tailored No. 3 finish. Reject rate dropped to less than 1% because the special surface was able to hold lubricant evenly, but smooth enough to draw and plate flawlessly.

Kromex is one more example of how strip, *tailored to end use,* works to produce a better product at lower cost. When you buy strip, you're buying a specific chemistry, temper, dimension, edge and finish that is consistently uniform within the coil or from coil to coil. Certain of your processing steps may actually be eliminated by using cold rolled strip, produced in our mills, and tailor-made for your specific end use.

Take a hard look at your production line and let our salesmen and metallurgical people look too. There's a good chance you can improve quality and cut production costs at the same time with *tailored-to-the-job* cold rolled strip from American Steel and Wire. American Steel and Wire Division, Rockefeller Bldg., Cleveland 13, Ohio. *USS and American are registered trademarks.*

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W. Coast Dealers Eye Defense Needs

There's some room for debate, but most Farwest dealers think the defense buildup will help sales.

But the general pickup in business is helping out, too.

■ Beefed-up defense spending will give a big boost to West Coast used machinery dealers.

There's optimism in all the major Farwestern markets. Some dealers already report increased sales. Consensus: Fourth quarter and going into 1962 should be healthy.

Check Your Markets — If you want to know who's getting some of the defense buildup money, there's a valuable guide: The IRON AGE, West Coast, Sept. 28, 1961. This money works its way down through to the subcontractor ranks. So the outlook for used machinery sales is good indeed.

Defense, however, isn't the whole reason. The area's continuing population increase puts the need heavily on consumer products. Much of the equipment now moving off dealers' floors go to makers of products like these: Automotive parts, sports equipment, metal home furnishings, garden tools, and equipment.

In Demand — What's moving best in the big southern California area? Grinders. After years of so-so sales, used machinery dealers report a flurry of business. One dealer sold six machines in six weeks. That's more than he moved in three years.

Supply of good grinders isn't too ample on the Coast. There's a strong demand for lathes and sheet metal equipment. But there's no supply problem on these items. Private and government auctions serve their needs.

Eager to Go—Optimism prevails among northern California used machinery dealers. Some signs of impatience are beginning to show because the expected sales surge still hasn't materialized.

Here's how one dealer puts it: "The war scare hasn't increased business one iota. We are feeling a slow constant improvement — but it's just the general improved conditions."

This dealer estimates the year should wind up 10 to 15 pct ahead of last year.

Prices are holding firm. Used machinery, made in the 1950's and in good condition, brings up to 65 and 70 pct of new, one dealer reports.

The wave of one-man shops—good customers for older machinery—continues strong. One dealer notes they gobble up for subcontracting jobs small milling machines and lathes in the $1000 class.

Market Factors—Another dealer, voicing concern as to what the defense build up will mean in the used machinery end of his business, observes that much of the equipment needed will be highly specialized and not available in used lines.

Punch presses, shears, brakes and lathes are among the better moving equipment, dealers in northern California report.

There is a little buying back East. Large equipment, like massive presses not available in the Farwest. Even after all the shipping and other expenses involved in such deals, a customer saves 30 to 35 pct. compared with equivalent new machines, one dealer figures.

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Capacity 5/8" to 3 1/2" Solids
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#1 MEDART
Capacity 1/2" to 2 1/2" Solids
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GRant 1-3594

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500#/hr. LECTROMELT Top Charge amplidyne controls. Like new

250# LECTROMELT—185 KVA
1000# SWINDELL—500 KVA
3000# HEROULT Door Charge
7' TOP CHARGE—2000 KVA
9' TOP CHARGE Swindell
11' TOP CHARGE—4000 KVA
DETROIT FURNACES—10 lb. to 300 lb. Cap.

• INDUCTION HEATING FURNACES

50 KW; 80 KW; 100 KW 2 station 9600 cy.—
15 KW GIRDLER Dielectric Heater
20 KW THERMONIC Induction Heater 2 station
20 KW ECCO Induction Heater

• CRANES

5 ton-50'-AC, W/300' of "A" Frame Runway. M.G. Set, Magnet, Bucket.

• INDUCTION MELTING FURNACES

175 KW AJAX Induction Mltg. Installation Ideal for non-ferrous work. With 2 lift coils, has tilting furnace for steel melting
500 KW AJAX Mltg. Installation 960 cy.

30 KW VACUUM Melting, Complete—Like New
200 KW 960 cycle. 100# steel

Large stock gas-oil-elec. heat treat units

• CLEANING EQUIPMENT AND GRINDERS

4—PANGBORN #2EZ Hydrofinish Cabinets Like New—Ideal for Wet Blasting Operation, cleaning forging dies or fine finishing.

4—PANGBORN Tables, 6'LK, 6'LG, 8'LF, 9'LG
20x27 WHEELABRATOR dust
27x36 WHEELABRATOR w/loader Collectors
36x42 WHEELABRATOR w/loader available
48x42 WHEELABRATOR w/loader for all
48x48 WHEELABRATOR w/loader machines
48x72 WHEELABRATOR w/loader
#1A WHEELABRATOR Multi-table
WHEELABRATOR Pipe Cleaning Cabinet to 12"O.D.
72" WHEELABRATOR Swing Table

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1—40" 2-HIGH BLOOMING MILL.
1—3-HIGH PLATE MILL, 40" x 26½" x 112".
1—32" & 20" x 56" 3-HIGH SHEET MILL with motor driven screwdown and pre-set controls.
1—25" & 42" x 66" HOT STRIP MILL, 4-high.
4—29" 2-HIGH HOT SHEET MILLS, with tables.
1—16" x 28" COLD MILL, 2-high, 200 HP drive.
1—26" COLD SHEET MILL TRAIN, 5 stands.
2—10" x 14" 2-HIGH COLD MILLS, 100 HP DC drives, with one coiler.
1—8" x 12" 2-HIGH COLD MILL, 50 HP motor.
1—3½" & 8½" x 5½" STRIP MILL, 4-high.
1—16" BAR MILL, 3-high, single stand.
1—10" BAR MILL, 3-high, 5 stands with two 3-high 10" roughing stands, drives, tables, flying shear and double hot bed.
1—9" BAR MILL, 3-high, five stands.
3—HOT STRIP DOWNCOILERS, for widths up to 75", max. coil diameter 54".
1—VERTICAL OPEN-SIDE BAR SHEAR, 28".
2—SQUARING SHEARS for ¼" x 156" sheets.
1—LEVELLER FOR ¼" PLATES, 9 rolls, 9" dia. x 108" face, 1940.
2—LEVELLERS for sheets, 17 rolls, widths 42", 66" ROLLS 4" DIAM.
1—AUTOMATIC SQUARING SHEAR UNIT for sheets, 160" side cut, 62" end cut.
1—ROLL LATHE, ENCLOSED HEADSTOCK, up to 40" dia. rolls.
2—42" WIDE COIL BUILD-UP LINES.
1—3000 HP GEAR DRIVE, ratio 4.6 to 1.
1—1500 HP GEAR DRIVE, ratio 8 to 1.
1—300 HP GEAR DRIVE, ratio 4.6 to 1.
1—400 HP GEAR DRIVE, 8.2 to 1 ratio.
1—3000 HP MOTOR, 2300/3/60, 356 RPM.
1—1500 HP MOTOR, 2300 volts, 3 phase, 60 cycle, 240 RPM.
1—600 HP MOTOR, 2300/4600 volts, 3-phase, 60 cycle, 450 RPM.
1—175 TON HOT METAL CRANE, 54' SPAN, 4 GIRDERS.
1—50,000 LB. DRAWBENCH for tubes, double chain, enclosed drive.

MECHANIZED SHEET MILL—3-HIGH AND 2-HIGH MILLS, CONTINUOUS FURNACES, ETC.

MODERN TWIN STRAND 17-STAND SEMI-CONTINUOUS ROD MILL WITH FURNACE, DRIVES, REELS, COIL CONVEYOR SYSTEM.

FRANK B. FOSTER, INC. 2220 Oliver Building, Pittsburgh 23, Pa.
Cable "Foster, Pittsburgh" Telephone Atlantic 1-2780

5" HORIZONTAL BORING MILL

Table Type Kempsmith-Defiance #26k
NEW IN 1956
CHARLES B. FORD
P. O. BOX 199 MOYLAN, PA.
Lowell 8-5418

EQUIPMENT AND MATERIALS WANTED

This section appears weekly and carries announcements of metalworking materials or used machinery and equipment wanted.

WANTED

One—tin plate shearing line, including flying shear, classifier, leveller, pilers and unwinds. Provide complete description of all functions

and

One—Heavy-duty roll grinder capable of:

Swing 50" diameter
Cover 16' length

to produce either concave or crown in varying amounts to accepted curves based on industry standards. Produce one micro-inch finish. Machine to be complete with journal rests, centers, grinding wheels, etc. Also complete with electrics quoted separately. Provide complete description of all functions.

Reply:
Harvey Aluminum
19200 S. Western Avenue
Torrance, California
Attention: Purchasing Agent

WANTED: STRAIGHTENER

Five-roll Pipe and Tubing Straightener with 8⅝" OD or larger capacity. Please furnish complete specifications, including make, model and serial number.

O. F. MALY
VALLEY STEEL PRODUCTS CO.
Louisiana, Mo.
Phone: SKyline 4-4542

WEISS STEEL CO. INC.
600 WEST JACKSON BLVD.
CHICAGO 6, ILLINOIS
Buyers of Surplus Steel Inventories
40 Years of Steel Service

WE WANT TO BUY
MILL SUPPLIES—TOOLS
NEW TOOLING OF ALL TYPES
DRILLS, TAPS, CUTTERS, ABRASIVES
DANN SUPPLY CO.
11311 E. 8 MILE JE 9-1660 WARREN, MICH.

WANTED TO PURCHASE—any quantity
CARBON—ALLOY—STAINLESS
Bars—Billets—Sheet—Plate
THE GILBERT MERRILL STEEL CORP.
91 New York Ave.—Westbury, L. I., N. Y.
EDgewood 3-7300

SURPLUS STEEL
NEW *WANTED* USED
Structurals, Plate, Pipe and Tubing
Consumers Steel & Supply Co.
P. O. Box 270, RACINE, WISCONSIN

WANTED
SURPLUS STEEL
WALLACK BROTHERS
7400 S. Damen Ave. Chicago 36, Illinois
GROVEHILL 6-7474

WANTED
BRIDGE CRANES
ARNOLD HUGHES COMPANY
2765 PENOBSCOT BLDG. DETROIT, MICH.
WOodward 1-1894

STAINLESS STEEL
Bought and Sold—All Types
Best Prices
S. S. MONSEIN STEEL
149 Nichol Ave. McKees Rocks, Pa.
FE 1-2355

WANTED
One—used 66" 5 or 7 roll leveller with 6" or 8" dia. tube type rolls (without drive) to provide back tension on aluminum sheet coiling line
AND
One—used 66" shear to cut ¼" aluminum with 5" to 8" opening (with or without drive) drive to be 440-V, 3-Ph, 60 Cy.
HARVEY ALUMINUM, Inc.
Purchasing Agent
19200 S. Western Avenue Torrance, California

EMPLOYMENT EXCHANGE

Help Wanted

WANTED
Industrial salesmen to sell steel for full line steel warehouse. Non-conflicting lines O. K., but must have steel sales experience. High commission rate. One man for each of the following areas: South Bend; Grand Rapids; Fort Wayne; Ann Arbor & Jackson; Flint; Lansing; Cedar Rapids; Des Moines; Kansas City, Mo.; St. Louis; Peoria; Springfield; Moline-Rock Island Area; Omaha; Louisville; Memphis; Nashville; Chattanooga.
Write to BOX H-223
c/o IRON AGE, Chestnut at 56th, Phila. 39

MALLEABLE IRON FOUNDRY SUPERINTENDENT
Experienced in all phases—to handle complete manufacturing process. Send resume to
BOX H-224
c/o IRON AGE, Chestnut at 56th, Phila. 39

METALLURGIST—graduate, age 28-40, for steel manufacturer. Prefer experience in stainless or alloy steel production. Plant located Middle Atlantic area. In resume furnish education, complete work history, salary expected. Equal opportunities employer. Write
BOX H-225
c/o IRON AGE, Chestnut at 56th, Phila. 39

WANTED
Assistant Superintendent Blast Furnace Operation. Young, well established, completely integrated Steel Company, located in Great Southwest area, needs to fill key position in its blast furnace department with well qualified man. Age limit 45 years. Company currently engaged in multi-million dollar expansion program. Excellent opportunity. Submit complete resume giving personal history, education, experience and salary requirements. All replies held confidential.
BOX H-217
c/o IRON AGE, Chestnut at 56th, Phila. 39

Situations Wanted

GENERAL MANAGER for Specialty Nail Producer seeks position with progressive company. Experience includes all phases purchasing, production and sales. Box H-222, c/o IRON AGE, Chestnut at 56th, Phila. 39.

INDUSTRIAL SALESMAN, financially responsible, wants active participation and investment opportunity up to $50,000 in well established firm manufacturing metal components or raw material. Wharton graduate 42 with 15 years' experience selling OEM and industrial consumers. Can relocate. References available Box H-221, c/o IRON AGE, Chestnut at 56th, Phila. 39.

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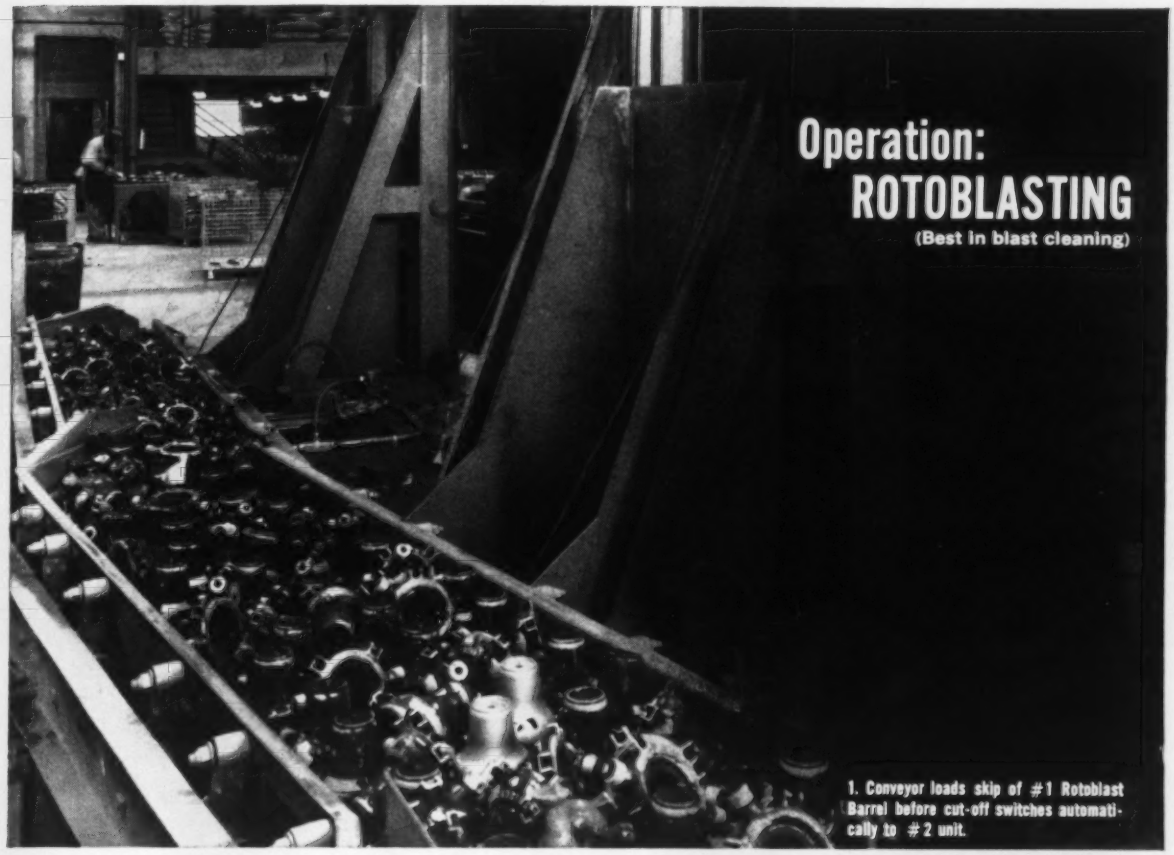


Operation: ROTOBLASTING

(Best in blast cleaning)

1. Conveyor loads skip of #1 Rotoblast Barrel before cut-off switches automatically to #2 unit.

Complete automation in blast cleaning!

Pangborn Rotoblast removes heavy sand cores and cleans up to 45,000 castings per shift at Neptune Meter!

A new and *completely automatic* Rotoblast operation not only cleans castings in half the time, but a new special separation removes heavy sand cores as well at Neptune Meter Co., Long Island City. The world's largest exclusive manufacturer of meters for liquids, Neptune can now handle 45,000 castings from the molds each shift . . . with just two automated Rotoblast Barrels.

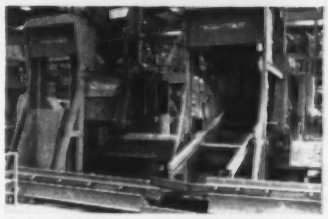
No costly or time-consuming manual lifting, toting or weighing here! Once the button is pressed, the Rotoblast sequence starts and recycles automatically until stopped at the end of the shift!

Whether your installation features automation or batch cleaning, Rotoblast cleaning efficiency can cut *your* operating and manpower costs. Flexibility of installation, ease of maintenance, durable construction—all contribute to lower overall cleaning costs.

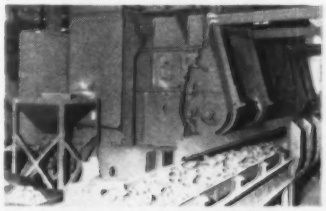
Write PANGBORN CORPORATION, 1500 Pangborn Blvd., Hagerstown, Md., Pangborn Canada, Ltd., 47 Shaft Road, Toronto (Rexdale), Canada; or phone district office in Yellow Pages, "Sand Blast Equipment." *Manufacturers of Blast Cleaning, Vibratory Finishing, Dust and Fume Control Equipment—Rotoblast® Steel Shot and Grit®.*

Pangborn

OF HAGERSTOWN

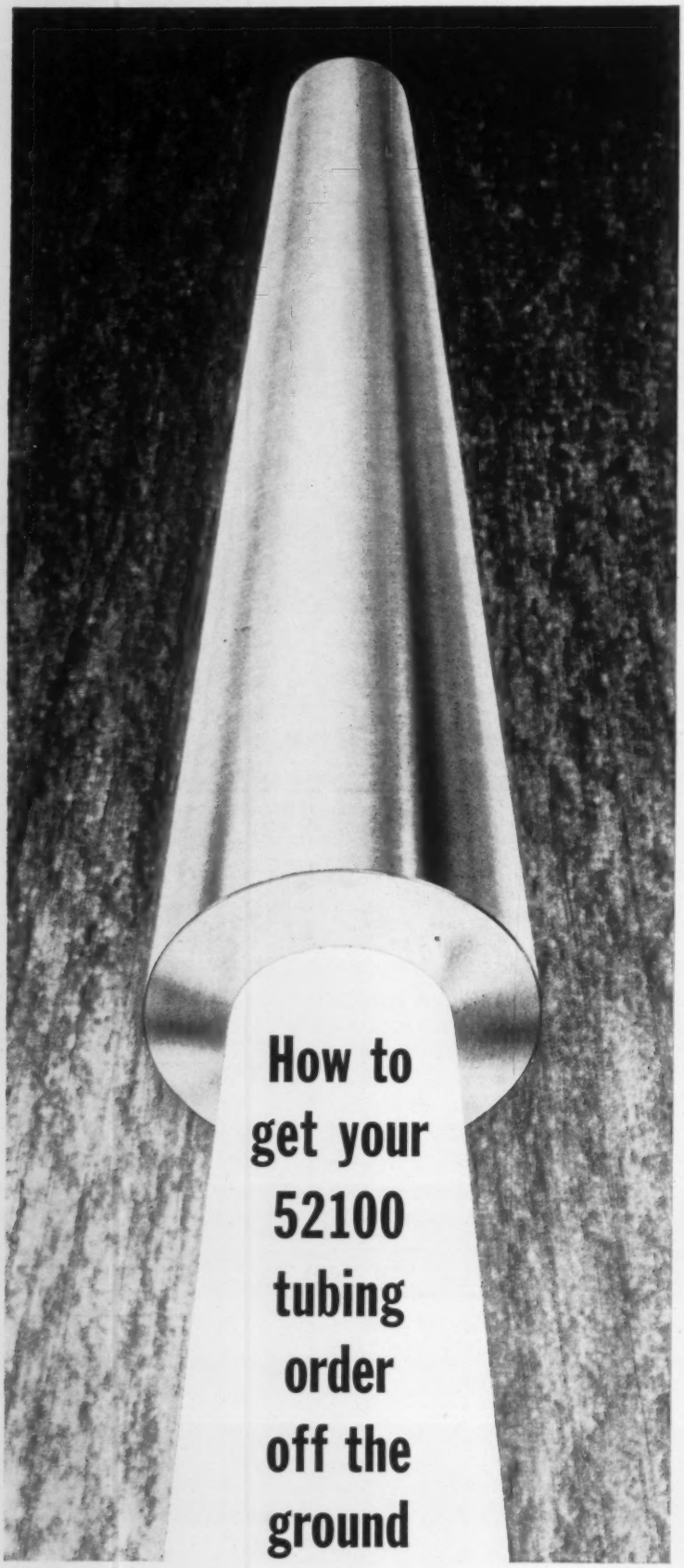


2. Skip fills second unit with exact pre-determined load for cleaning.



3. Cleaned castings move on take-away conveyor to next operation.

4. Before and after Rotoblasting. Note core sand and rods in uncleaned piece.



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